The Chemical Age

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The Training of a Chemical Engineer

THE end of the university year and the preparations now being made to start a new academic year prompt a few remarks upon this important subject. One of the most significant remarks we have heard for a long time was that made by the genial old Professor Müller, who said that of the students who came to a university, 2 per cent. were highly gifted, 8 per cent. well gifted, 40 per cent. possessed average gifts, and 50 per cent. were below average; those who were highly gifted would make their way whether they were trained or not, and the purpose of a university curriculum must be to fit the other 90 per cent. to be of use to industry. We are afraid that the reverse is sometimes true and educational institutions tend to concentrate on cramming the brilliant. An old and wise headmaster of a preparatory school remarked to us not long since that to-day long holidays were becoming more important than ever because of the increase in meningitis among boys on account of brain fag. The older youths who attend universities may not get meningitis, but they are apt to get something worse in their case—a mental indigestion which, like too prolific flowering of a plant, causes early exhaustion of brilliance.

Many of the finest brains do not develop until late, and then bloom brilliantly, possibly because it was impossible to cram them with largely useless knowledge. Those who have accumulated much wisdom in perhaps 40 to 70 years of life must not expect the adolescent of 20 summers to mop it up greedily and easily and ask for more. Should we not, then, make our courses in higher education simpler? Should we place so much store on learning by heart as we do, for example, in organic chemistry? Should our examination papers not leave out all but fundamental facts in what must be remembered and permit greater use of text-books in written papers, asking such questions as demand thought coupled with the requirement that the student must have fully understood what is in his text-book before he can refer to it in the examination room with any hope of success? There are many teachers who hold that it is the duty of a university to teach fundamentals only and that specialisation must be avoided. It is an old gibe, or truth, and still remains true, and few students leaving educational institutions are of any value to their firms at first.

There are many technical schools and universities wherein are courses that attempt to do the exact opposite and do it successfully. There are departments that deal solely with certain industries, as iron and steel, non-ferrous metallurgy, coal gas, coke ovens, mining, leather technology, dyeing, and the like. All these prepare men for specific industries and concentrate on those industries from the beginning, though doubtless with a preliminary grounding in general science at least up to the intermediate standard. In these institutions the men entering the special departments have already made up their minds what work they propose to do, but in chemical engineering, a man may, after graduation, enter any branch of the chemical industry. The purpose of any educational process applied to the individual is that he should go out into the world and earn his living in whatever way comes to his hand.

Some feature should be introduced in the training which shall assist to give to the chemical engineer, in his immediate capacity as plant and process engineer, and his later capacity of works manager, the ability to control men and to get the best out of them. Many of the students' out-of-class activities are valuable for this end, and we suggest that it should be a *sine-quanon* of granting a degree in chemical engineering that there should have been an interest taken in one or other of these selected activities.

One of the major points to which little attention is paid in this country is the control and selection of teachers in chemical engineering. This is a matter of extreme difficulty. Professors of foreign universities have indicated that the teacher should be trained for his work, the method suggested being that after taking his degree he should teach in some minor capacity for a while; then he should go on to the works as an ordinary engineering employee for a few years, and afterwards, if he feels the urge in that direction, he should return to the university to teach. There are three objections to that. One is removable if the will to remove it is there; it is the difficulty of getting back to the university in view of the competitive method of making appointments. Sometimes "kissing goes by favour," and the man who has been out of academic life for a few years is not readily welcomed back.

The second difficulty is more serious and is that after a few years in a works, any chemical engineer really worth anything will be in receipt of a salary greater than an academic institution could afford to pay him. Finally, there is a third and even greater difficulty—that of selection of the right men to teach. Teaching, real teaching, is a gift which few possess. The possession of knowledge does not give the power to impart it—quite the opposite in many instances. We have ourselves suffered so much from uninspired teaching that we can fully appreciate the point of view of the student who confessed that certain lecturers sent him to sleep after about 20 minutes, with unfailing regularity.

Notes and Comments

The World Power Conference

MANY of the chemical engineers who assembled in London in June for the Chemical Engineering Congress will meet again in Washington on Monday for the third World Power Conference and the second International Congress on Large Dams. So large a part of previous meetings has been devoted to the purely technical side of power developments that it has been deemed desirable to change the emphasis at Washington and to consider the more fundamental and in many respects more important problems of the relation of the power resources, their development and use to the social and economic interests of the nations. The power with which the conference will be concerned is energy as represented by coal, oil, natural gas and water, and the papers have been prepared with a view to surveying national power economy, including the organisation of industry, conservation of natural resources, national and regional planning, and broad matters of policy with respect to the utilisation, operation and administration of power. Two sections in particular will be of interest to chemical engineering, Section 2, in which the history and status of coal carbonisation and hydrogenation and of petrol production and refining will be considered, and Section 4, which deals with the relation of national planning to the conservation of the natural resources of coal, petroleum and natural gas. The United States Government is taking note of the conference and delegates will be addressed by the President of the United States on Friday, followed by a reception and garden party at the White House. The first opening session of the conference will be held at Constitution Hill, Washington.

British Plant for Synthetic Vitamins

CONSIDERABLE interest attaches to the announcement that Roche Products, Ltd., a British company connected with the Hoffman-la-Roche organisation, are to erect at Welwyn Garden City a large-scale manufacturing plant for synthetic vitamins, in particular vitamin C. The new chemical and pharmacological laboratories, which will not be ready before 1938, will be staffed by scientists of international repute. It is generally acknowledged that continental countries have made greater progress in vitamin chemistry than we have done here, and it has been with some concern that Government circles and those responsible for our health and prosperity have noticed the increasing importation of continental medicinal products, fine chemicals and drugs. Even when such products are manufactured at home by British firms, either from imported chemicals or under licence, this country is still handicapped by the fact that so many of the responsible chemists and pharmacologists work abroad and are not available to this country in times of emergency. Those who will be employed at Welwyn will have the advantages of close collaboration with continental chemists; indeed, many of them will actually have been trained abroad before coming to Welwyn. Details of the factory and the processes to be carried out there are not yet available, but all the pharmaceutical specialities now issued under the name "Roche" will as a matter of course be made at Welwyn, and in addition the company has made arrangements for the manufacture of several chemicals which to-day are not made on a large commercial scale in this country, amongst which we can divulge l-ascorbic acid as being one of prime importance.

Anti-Gas Training

THE Air Raid Precautions Department of the Home Office continues to play schoolboy chemistry. It has just published an official memorandum on "Anti-Gas Training," price one penny, for issue to all "county councils, county borough councils and metropolitan borough councils in England and Wales," Scotland (apparently) being excluded for reasons understood only by the official mind as always since the days of the Union in the reign of Queen Anne. We note, with especial interest, that the normal syllabus of training (for those who have matriculated, we presume) includes the wearing of a gas mask in an atmosphere charged with tear gas. There is no mention whatever of any other gas being employed in the mobile gas chambers which are being loaned to local authorities for training police and other municipal officers. Is the official eye so badly in need of spectacles that it fails to see that tear gases are only a few of the many gases which would be employed in attack by enemy aircraft, even though other gases are already recognised to exist? Alternatively, is the tear gas stage equivalent to the intermediate B.Sc. training, with real poisonous poison gases in the syllabus for the final B.Sc.? Might we also ask if the gas masks which are being used in anti-gas training are, regrettably, not yet sufficiently efficient for poison gases to enable real poison gases to be used in the gas chambers without danger?

The Public Schools' Business Society

A NUMBER of well-known companies have already contributed to the Public Schools' Business Society as the result of an appeal signed by Sir David Milne-Watson, Sir Patrick Hannon, M.P., and other distinguished supporters. As already reported in THE CHEMICAL AGE, the society has been founded to provide a meeting ground for public school boys starting in business in London. Besides fulfilling a real need by establishing an inexpensive club, the society will organise debates on business matters and addresses by men and women prominent in different spheres of national life. At the discretion of the committee, young men from overseas visiting Great Britain on business or for educational purposes will be admitted to membership. Among the companies which have so far contributed (the maximum donation has been fixed at £10), are C. C. Wakefield and Co., British Metal Corporation, British Celanese, Ltd., General Electric Co., United Steel Companies, Union Cold Storage Co., etc. More than 200 members have already enrolled at a guinea per annum, but a further sum of £250 is required before club premises can be rented. Donations from firms or individuals will be welcomed by the honorary secretary, Mr. Kenneth Hare-Scott, 12 Cranley Gardens, London, S.W.7.

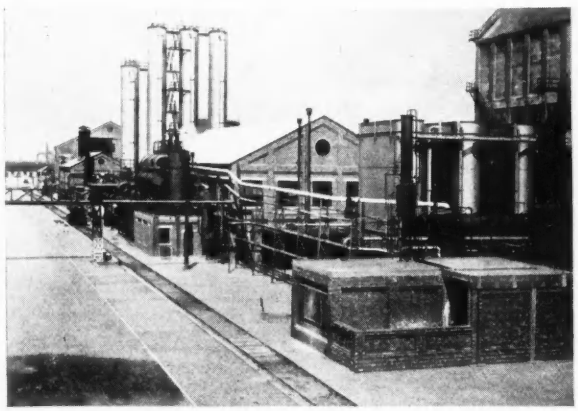
A Modern Coke Oven By-Product Installation

New Plant at the Works of the Workington Iron and Steel Co., Ltd.

Eight cottages for retired employees, erected from funds presented by the company to the employees for the creation of a permanent Silver Jubilee Year Memorial, near the works of the Workington Iron and Steel Co., Ltd., were opened onThursday when the company took the opportunity of showing a large party of visitors round the new coke oven plant which has just been completed. It is hoped at a future date, should funds permit, to extend the scheme and build further cottages alongside those opened on Thursday.

EXTENSIVE plant reorganisation at the works of the Workington Iron and Steel Co., Ltd., entailing considerable expenditure, has been undertaken by the company in order to lower costs of manufacture. The Derwent blast furnace plant has been mechanised and a modern acid Bessemer plant has been put up in place of the old plant which operated continuously from 1872 until 1935; and in pursuance of their policy of reorganisation the company decided to install a modern by-product coking plant which is now in operation.

The plant, in addition to producing a high-grade coke of uniform quality, recovers from the gas evolved in the ovens valuable by-products in the form of tar, ammonium sulphate, motor fuel, toluol and naphthalene; the sale of these contributes towards lower manufacturing costs of coke, which advantage is ultimately passed to the pig iron. A portion of the gas after by-product removal is used in heating the ovens and for steam raising whilst the rest is available for use in



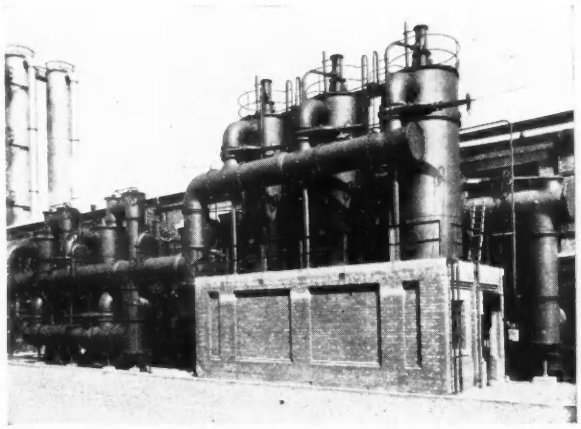
The primary coolers, by-product house, detarrers and benzole scrubbers, with ammonia distillation plant in the foreground.

industry and for domestic purposes. It has a high calorific value and is therefore particularly suitable for heating and power raising.

At these works the by-product plant is of the semi-direct type, with equipment for the recovery of crude tar and sulphate of ammonia. Plant is installed for the recovery of crude benzole and its rectification to motor spirit, toluol and naphthas. A special continuous still is incorporated in the benzole rectification plant for the removal of carbon disulphide from the unwashed product. After leaving the benzole scrubbers, the gas stream is divided; a portion is returned to the ovens for heating purposes and a quantity of that remaining is consumed at the steam boiler plant, and the remainder passes to a surplus gas main. A 100,000 c. ft. gasholder is installed to maintain gas pressure and for storage.

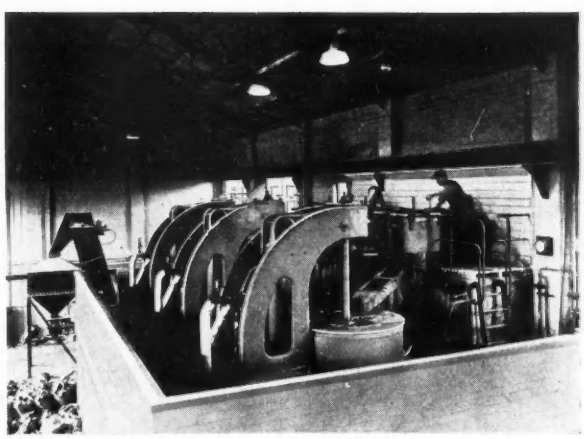
Ammonia Saturators and Acid Separators

From the electro-detarrers the gas passes through a reheater before entering the ammonia saturators, two of which are provided, one acting as a stand-by. The saturators consist of steel shells with cast-iron conical bottoms carried on cast-iron columns and provided with dome shaped cast-iron tops. The vessels are lead-lined and provided with lead cracker pipes. The gas bubbles through the sulphuric acid bath contained in the saturators and passes through separators, where any traces of entrained acid are removed. One acid separator is provided for each saturator.



W.W-D Electro-detarrers on their generator house, with ammonia saturators and acid separators at the side.

The saturators are placed in the open and in this way space in the sulphate house is materially economised, while repair and maintenance of these units are facilitated. Each saturator is provided with a bronze salt ejector for discharging the sulphate produced, each ejector pipe line being supplied with a bronze fitted air separator for removing air from the wet sulphate.



Interior of the sulphate room, showing draining tables and centrifuges on raised platform.

Two air compressors are installed; one electrically operated and the other, which acts as a stand-by, steam driven. These supply compressed air for the sulphate and acid ejectors and for elevating acid from storage to feed tank.

The wet sulphate is ejected into one of two drain tables consisting of cast-iron boxes lined with lead. After draining, it is dried in centrifuges, three of which are provided, each

having a capacity of approximately 600 lb. of sulphate. These are of the suspended self-balancing type and are driven by steam engines. From beneath these driers the sulphate is fed by means of wooden chutes on to a scraper conveyor, which delivers it into a " Wilton " drier, which both dries and neutralises the salt. This apparatus is specially adapted for using ammonia gas as a reagent for neutralising, instead of ammonium carbonate.

A feature of this plant is the equipment installed to prevent any dust nuisance arising from the draughting of the " Wilton " drier. This is effected by a motor-driven fan which draws air through the drier. The air, after passing a baffled dust trap, enters a lead tower suitably packed through which water is circulated. This ensures complete removal of the last traces of dust and the exhaust to the atmosphere is perfectly clean and free from ammonia.

The dry neutral sulphate is discharged into an elevator which feeds it into a bagging hopper of 30 cwt. capacity, provided with an automatic bag filling and weighing machine, equipped with a self-registering device.

Ammonia Still

The ammonia liquor condensates from the primary coolers is distilled in a still situated in the open air adjacent to the coolers. The still has a capacity of some 3,000 gal. of ammonia per hour. The free section contains six trays and the fixed section nine.

An orifice type meter is provided for measuring the ammonia liquor entering the still, which is also equipped with a waste liquor trap. Lime slaking and mixing apparatus is provided, while two open impeller type pumps, one of which is a stand-by, are installed for supplying the lime water to the still.

From the fixed section of the ammonia still a portion of the ammonia vapours passes through special apparatus for preparing ammonia gas for the " Wilton " neutraliser and drier. This comprises a small column and a reflux condenser, from which the liquor is drained back into the ammonia still. The rest of the ammonia vapours pass direct into the gas stream immediately before it enters the saturators.

Ammonia Liquor, Tar and Acid Services

Ammonia liquor from the liquor compartment of the flushing and separating tank is pumped into a weak ammonia liquor storage tank having three days' storage capacity. Two electrically driven centrifugal pumps are provided to transfer the liquor from the storage tank to the ammonia still, one pump being a stand-by.

The tar from the tar compartment of the liquor flushing and separating tank is delivered by one of a pair of steam driven pumps into a storage tank having a capacity equal to four days' production. The second pump is a stand-by. From the tar storage tank the tar is loaded into tank wagons as required, by means of the tar transfer pump. The drainage from the exhausters and electro-detarrers and overflows from the tar and ammonia storage tanks are received in a reinforced concrete condensate drain pit, whence they are transferred into the tar and liquor separating tank by means of a steam driven pump, to which the second tar transfer pump also acts as a stand-by.

A lead-lined mother liquor tank of 4,200 gal. capacity receives any condensate from the gas main after the separators and acts as a reservoir for emptying the saturators. The tank is situated at yard level and mother liquor is delivered from this tank to the saturators by means of a bronze acid ejector.

By-Product Buildings

The main by-product plant building is a still-framed brick-panelled structure, the steelwork being completely encased. It is divided by a partition wall into two sections. One section forms the exhauster and pump room containing, on a raised platform, the exhausters, gas and steam pressure gauges and Askania regulator, and on the ground floor the liquor flushing, tar and ammonia pumps and air compressors. In this portion of the building, the floors are finished with red and black unglazed tiles, the walls with a dado of white glazed tiles above which they are cemented and distempered.

The other section of the by-product building forms the sulphate house and store, and contains the sulphate draining, dyring, neutralising and bagging apparatus, the drain tables and centrifuges being situated on a raised concrete platform surfaced with acid-proof tiles or lead as required. The remainder of this portion of the building has a concrete floor which acts as a sulphate store, the floor being at a suitable height above ground level for loading bags into railway vans. Two three-ton capacity hand operated travelling cranes are provided to operate in the exhauster and pump room, and the sulphate room. A water heater is installed to provide hot-water for use in the centrifuges and for washing floors and platforms. A lime mixing and storage house is provided adjacent to the ammonia still.

A smaller mother liquor tank receives drainage from the floors, this being disposed of by a second bronze ejector. Acid for the saturators is stored in two 7,000 gal. capacity tanks, and a 1,000 gal. elevated tank is provided to feed acid to the saturators.

Crude Benzole Recovery

After leaving the saturators and acid separators the gas passes through a tower type final cooler, packed with wooden hurdles, where the naphthalene is removed. The water from this cooler passes to a naphthalene separating sump and is then cooled in a forced draught cooling tower before being recirculated. After final cooling, the gas is debenzolised in three hurdle type tower scrubbers, each 98 ft. high, and passes through the scrubbers meeting a descending stream of wash oil, which absorbs the crude benzole.

The wash oil, enriched with benzole, is delivered into a specially designed distilling apparatus provided with the necessary heat exchangers, condensers and coolers.

On its way to the still, the cool, benzolised oil is first passed through a dial type meter and two vertical tube vapour-to-oil heat exchangers, normally worked in series but each capable of being by-passed. In these heat exchangers heat is transferred from the crude benzole vapours leaving the still to the benzolised wash oil. The wash oil is then steam heated in a pair of final heaters and enters the cast-iron wash oil still. This is composed of a series of fourteen trays where the crude benzole is removed by intimate contact with steam.

The crude benzole vapour passes from the still through the vapour-to-oil heat exchanger and a closed cooler into a separator for removal of water. This separator is provided with sight overflows for benzole and water.

Benzole Refining

The crude benzole flows into a storage tank of 10,000 gal. capacity. From here it is delivered by a steam driven pump into the steam heated tank of the crude benzole still, which has a capacity of 8,300 gal., and thence through the rectifying column of this still. The still is equipped with a dephlegmator arranged for either returning the condensate to the rectifying column or passing it to a closed cooler for condensing and cooling the crude once run product. This product passes into a water separating tank and thence to either of two 10,000 gal. tanks for storage, and the crude heavy naphtha from the crude still flows to a tank of 5,000 gal. capacity.

The once-run product is raised by a steam driven pump to an overhead receiving tank from which it is fed through a constant level tank, a heat exchanger and a vertical tube type heater to a Barbet type continuous still for removal of carbon disulphide. This still comprises a bottom section with stripping plates, a top section with rectification plates, a reflux chamber and a dome. Each section is equipped with the necessary bubble caps and overflow weirs.

The heads fraction containing the carbon disulphide passes through a vertical tube condenser, a decanter tank, a sight flow and a measuring device to a 500-gal. drum-filling tank.

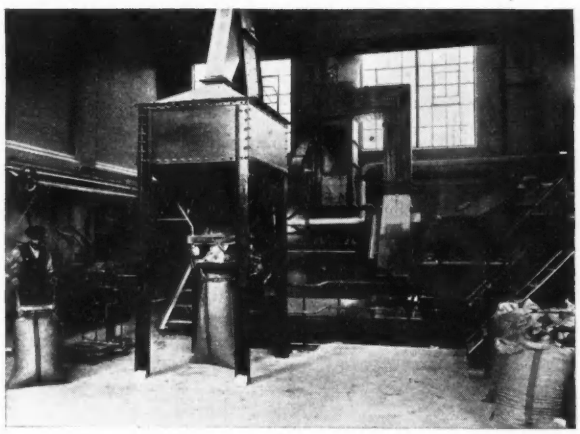
The carbon-disulphide-free benzole passes through the heat exchanger and a horizontal tube type final cooler to a 10,000 gal. storage tank. From this storage tank it is normally delivered to an agitator of 4,600 gal. capacity. After acid and soda washing, the washed benzole is either delivered to a 10,000 gal. washed benzole storage tank or direct into the steam-heated tank of the final rectification still. Thence it passes through the final rectification column. The rectified benzole passes through a dephlegmator, a final cooler and a water separator to two receiving tanks, whence separate pipe lines are carried to the two 5,000 gal. compartments of a motor fuel running tank. From here motor fuel is pumped to a storage tank of 45,000 gal. capacity.

The 90's toluol and refined heavy naphtha from the final still are each delivered into separate storage tanks of 5,000 gal. capacity, and the finished products are loaded into road or railway tank wagons or into drums as required.

Benzole Plant Services

Oil residue from the crude still is delivered by a pump into two cooling pans where the naphthalene crystallises out. This is finally dried in a suspended self-balancing centrifuge which is steam driven.

The hot debenzolised oil from the wash oil still passes into a hot drain tank of 3,000 gal. capacity. Thence it is delivered



Interior of sulphate room showing the Wilton drier and neutraliser, and sulphate bagging hopper.

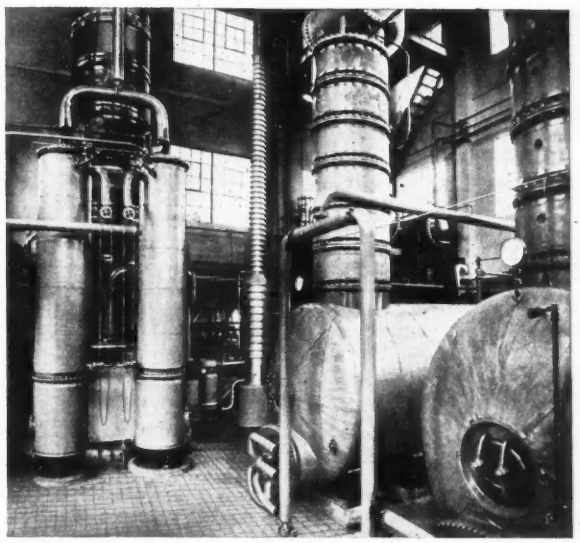
by an 8,000 gal. per hour electrically operated centrifugal pump to a wash oil cooler with twelve banks of 2 in. galvanised pipes. The cooled wash oil then flows to the 6,000 gal. wash oil circulating tank whence it is pumped through the three scrubbers counter-current to the gas flow. Two electrically driven centrifugal pumps each of 16,000 gal. per hour capacity and one of 8,000 gal. per hour capacity are provided for this duty. After leaving the last scrubber the enriched oil is delivered to the wash oil still by a futher 8,000 gal. per hour pump.

A wash oil storage tank is installed divided into two equal compartments of 5,000 gal. capacity each, one for spent oil and one for fresh wash oil. A 300 gal. per hour pump of the steam driven duplex type is installed to deliver once run products to the carbon disulphide still receiving tank, and two steam driven reciprocating pumps of 6,000 gal. per hour capacity for charging carbon disulphide free benzole to the agitator and washed benzole to the final still.

The agitator is driven by a 15 h.p. totally enclosed vertical steam engine and two meter tanks are provided for measuring the acid and soda delivered to it.

Instruments

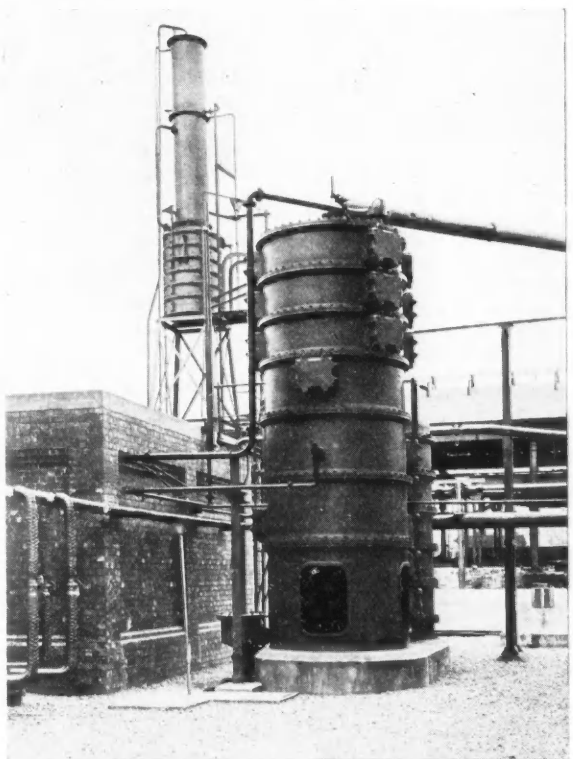
The instrument equipment of the plant is very comprehensive, comprising three main groups: that for the battery, centralised in the control room; that for the by-product plant,



Final wash oil heaters and still, carbon disulphide removal still, crude benzole still and rectification still (part seen).

arranged in the exhauster room; and the benzole plant instruments, located in the benzole house.

Askania regulators are used for controlling the stack draught the collecting main pressure and the exhauster suction, maintaining constant conditions at each point. The plant gas meters are of the integrating recording and indicat-



Ammonia still, showing also the column for preparing the ammonia gas used in the Wilton drier and neutraliser.

ing type and measure the volume of coke oven fuel gas to the battery and the total gas into the holder, whilst steam meters are provided for the total steam from the boilers and also for

the quantity used in the by-product plant and benzole plant.

Recording pressure gauges are employed for the waste gas flues, the fuel gas main, the collecting main, before and after the primary coolers, for the flushing liquor to the ovens and on the main steam supply. Indicating pressure gauges of the manometer type are used to show the gas pressure throughout the by-product system, being grouped together on a common board in the exhauster house for ease of observation. At various other points dial type gauges are employed.

Temperatures in all sections of the plant are indicated either by dial type thermometers or by multi-point resistance instruments, the latter being conveniently arranged at two points to centralise control in the by-product and benzole plant buildings. Recording thermometers are also employed in several positions of particular importance, amongst which may be mentioned the main flue to the battery stack.

Fume Emission at Alkali and Related Works

Report of the Chief Inspector for 1935

ACCORDING to the 72nd Annual Report on Alkali, etc., Works (H.M. Stationery Office, 9d.) the number of works registered in 1935 was 977, which involved the operation of 1,846 separate processes. There has again been a decrease in the number of by-product sulphate of ammonia processes, but an increase in the number of those by which concentrated gas liquor is produced. There has also been a substantial increase in the number of benzene works. The totals show an increase since last year of 59 in the number of works registered and of 87 in the number of processes. The increase is due to the coming into operation last April of the Alkali, etc., Works Order, 1935. Under this new Order, 69 works and 106 processes were registered.

A number of proofing works, in which carbon bisulphide is used now come under the provisions of the Act, as do processes for the production of "factice" (rubber substitutes). The old definition of cement works, which confined registration to works using aluminous deposits is superseded by the new and wider definition of "cement production" works. All such works are now registrable whatever may be the source of their raw material.

The number of visits paid to works during the course of the year was 4,317, this number including 124 special visits paid by the Chief Inspector. In connection with the inspections 2,320 quantitative analyses were made of chimney and other gases escaping to atmosphere from the processes in operation.

The number of cases in which the statutory limits of acidity prescribed by the Act has been exceeded, is very slightly greater than in last year. In view of the more stringent method of testing, which has been used at sulphuric acid works, this was to be expected. In none of these cases or in others, where the provisions of the Act were infringed, were the circumstances considered to be sufficiently serious to justify the institution of legal proceedings.

Position More Than Maintained

Chemical industry has more than maintained the position it had secured at the end of 1934. The demand for coke has increased so that coke ovens have, for the most part, been operated at their full capacity and a number of old ovens have been replaced by new batteries of greater capacity. There has also been an excellent demand for low temperature smokeless fuels. The huge plant for coal and oil hydrogenation at Billingham has received much well deserved publicity and appears to be functioning in a very satisfactory manner. The rayon (artificial silk) trade has operated on an even higher level of production than last year and there are indications that the associated industry of transparent paper making will also increase rapidly. Sulphuric acid production, often regarded as a reliable index of trade generally, has increased by 7 per cent. An increased output of spelter is also to be noted.

Smaller and less efficient undertakings are being absorbed, old plant is being modernised or scrapped and, given reasonable stability in world markets and exchanges, there is every prospect of that position being still further improved in the current year.

The emission of noxious and offensive gases is controlled, in so far as chemical works are concerned, by the provisions of the Alkali Act. Broadly speaking, any process, registrable under the Act, must adopt the best practicable means for preventing the emission of such gases to the atmosphere.

The discharge of solid particles can be avoided with comparative ease if they are not too small. Modern plant of the cyclone type is quite effective in the arrestment of particles exceeding 30 microns (one micron=0.001 mm.) in diameter. In the case of smaller particles—and particularly when they are suspended in a large volume of gas, as in flue gases from plants using pulverised fuel—the difficulty is much greater. It may then be necessary to employ electrostatic precipitation plant or an elaborate system of wet washing. Cement producing plants are also responsible for the emission of dust.

"Green" Gas from Coke Ovens

A feature of coke oven practice, which has lately increased, gives cause for some anxiety. This is the use of "shock" gas coolers. The crude gas is cooled by direct contact with a large body of water and during the process a certain amount of hydrogen sulphide is dissolved. The effluent water is then pumped to the top of a cooling frame and allowed to fall, meeting a draught of air driven upwards by a fan. In this second stage of the process the dissolved hydrogen sulphide is liberated from the water and escapes to atmosphere. Tests made at the top of the cooling frames have shown concentrations of up to 100 parts of hydrogen sulphide per million of air. This may seem a small figure but it must be remembered that the total volume of air is large and the emission is continuous. Steps should be taken either to "fix" the hydrogen sulphide in the water or to oxidise it to sulphur.

Fumes from Gasworks

It was reported last year that complaints were received of sulphurous emission in a district where tar distillation and sulphate of ammonia plants were operated at a gasworks and a sulphuric acid plant at an adjoining chemical works. A number of lead peroxide cylinders were installed with a view to testing the atmospheric condition. Examination of these cylinders (one of which was installed in the chief complainant's garden) showed that the allegation of serious and continuous pollution could not be sustained. It was suspected that breakage of glass retorts at the sulphuric acid works was the cause of intermittent nuisance but such occurrences were found to be infrequent. A process at the gasworks was also suspected of contributing.

Alkali and Wet Process Copper Works

The tonnage in salt decomposed in 1935 was:—In the salt-cake process, 57,262 tons; in the wet copper process, 5,201 tons. Compared with those of last year these figures show a decrease of 1,417 tons in the salt-cake process and a decrease of 2,560 tons in the wet copper process. The average escape of hydrochloric acid gas from these works to atmosphere was 0.075 grain per cubic foot, which figure is a little higher than that of last year.

There have been two occasions when the results of tests made by the inspectors have been in excess of the statutory maximum. At works No. 2150 an escape of 0.23 grain was found, and this was quickly rectified. At works No. 6560 two tests averaging 0.36 grain were made. This was due to a leakage into the waste gas flue. The leakage was made good and, at the same time, a number of other improvements were made. In two cases, improvements to the systems have been effected by the installation of silica condensers. Works No. 4905 is being entirely rebuilt and it is hoped that the plant—a very fine one—will be in operation very shortly.

Rubber-lined steel pipes are being used for carrying gases of temperature below 130° C. The cost is somewhat high but there is no doubt that their adoption reduces escapes which so frequently occur by reason of faulty joints and cracked earthenware mains.

There is only one wet copper works in this country in regular operation. This has been in almost continuous use during the year, and although the escapes have been within the permitted limit, yet there has been very little margin. Additional scrubbers are really required but financial considerations have had to be considered, for, in face of the more complete extraction processes employed elsewhere, the wet copper process can make only a very modest profit.

Cement Production Works

Many complaints of excessive dust emission at cement works have been received, and it must be admitted that usually there has been some justification. The system of intensively "chaining" the feed ends of kilns has been effective in reducing dust emission and in economising fuel. The use of calcinators has grown in favour and has undoubtedly tended to increase dust emission. Where such plant is used the employment of highly efficient de-dusting plant is imperative.

The calcinator, which should more properly be termed an evaporator, consists essentially of a large drum, rotating at right angles to the kiln and containing a number of "elements." The slurry is fed into the upper part of the calcinator and, becoming distributed over and through the elements, is subjected to evaporation by the hot gases from the kiln mouth which also pass through the calcinator in a counter direction to the flow of slurry. As considerable trouble was caused by the clogging up of the elements, the managers of two works in the Midlands collaborated in the design of a new element which they claim obviates this difficulty. This type is now in use and certainly seems to be an improvement. Nevertheless, dust emission from the calcinator is still high.

The wet washing of the gases at works No. 6345 continues and is extremely efficient in the removal of dust. The sulphur oxide content of the gases is, however (somewhat surprisingly), virtually unaffected, and the effluent gases being cold and moist tend to fall with but little dispersion.

Smelting Works

Two works for the smelting of molybdenite have been registered. The process is a slow one and, by spacing out the charging of the furnaces, the acidity of the escapes can be kept reasonably low and uniform. Following an increase in price of the metal, antimony smelting has been resumed at a works which has been idle for many years. The plant has operated satisfactorily and acid emission has been very small.

The National Smelting Co. have operated their Avonmouth and Swansea works to full capacity. Zinc blende is roasted and subsequently reduced to the metal and the acid fumes evolved are recovered as sulphuric acid in a contact plant. A second unit for smelting of galena was brought into use at works No. 1495 and this had the effect of increasing the acidity of the chimney gases from this section of the works. The question of treatment of the gases has been studied, but, under the somewhat exceptional circumstances obtaining, none of the normal methods seems to be applicable.

At the works of the Mond Nickel Co., at Clydach, the system of calcining a mixture of sintered and Bessemer mattes has been continued with a consequent reduction in the amount of sulphur discharged. The number of calciners is being increased and electrical precipitators are being installed in order to remove dust from the calciner gases before their emission to atmosphere. The distribution of gases between the several stacks will be improved by means of fans. The company has made an advance in a unique process by the development of a plant for the extraction of nickel by means of carbon monoxide at high pressures. The degree of atmospheric pollution in the neighbourhood of the works has been observed by the lead peroxide cylinder method, which was evolved at the Building Research Station, and there is no evidence of gross pollution beyond what is to be expected in an industrial district.

Sulphuric Acid Works

The production of sulphuric acid in England and Wales during 1935 was 784,000 tons, calculated as monohydrate. This is an increase of 54,000 tons compared with the production in 1934. According to the National Sulphuric Acid Association the following data is available:—

	1935 Per Cent.	1934 Per Cent.
Proportion of available plant in use	74.0	72.0
Proportion of total made in:—		
(*a*) Chamber Plant	70.1	72.3
(*b*) Contact Plant	29.9	27.7

Raw materials used as a source of sulphur supply were as follows:—

	Tons.
Pyrites and anhydrite	272,900
Sulphur and H_2S	49,500
Spent Oxide	141,500
Zinc Ores	126,500

Throughout the past year, inspectors have been employing the modified method, described in Appendix V of the 71st Report, for measuring the total acidity of escapes from chamber plants. This method takes into account the acidity due to oxides of nitrogen as well as that due to oxides of sulphur and it was anticipated that a 50 per cent. increase in the average escape figure would result. Actually, the average of all escapes was 1.61 grains (as SO_3) per cu. ft. compared with 1.28 grains in 1934. The increase, therefore, was but 26 per cent. which is gratifying and possibly an indication that works have appreciated that there has hitherto been an unnecessarily high nitre loss and are taking steps to reduce it.

New Plant of Novel Design

A new Moritz plant of design novel to this country is in course of erection. It is expected to be completed very shortly and its performance will be followed with particular interest. Ammonia oxidation for the supply of oxides of nitrogen has been adopted at two more works. The provision of thermo-recorders on chamber plants has been another feature which has proved of assistance by showing the trend of plant operation rather than its momentary condition.

Complaint has been directed against three works. In each case the escapes have been maintained within the permitted limit, but efforts have been made to reduce them still further. At works No. 4905 a water wash of the gases is effected between the first and second Gay Lussacs. The plant is worked intensively, employs spent oxide and produces 800 tons B.O.V. per week. The average acidity of the escape was 0.46 grain (highest 0.7 grain; lowest 0.1 grain) which is a remarkable achievement.

At oleum works the average escape (3.99 grains) remains high; indeed, it is a little higher than last year.

Relating to sulphurous escapes, certain patents, which have been granted, are of special interest. According to S. Robson and P. S. Lewis (B.P. 425,179) residual gases may be passed through a series of glass packed towers—the first is irrigated with 60 per cent. acid, and the second with 16 per cent. acid, whilst the last is sprayed with a 0.1 per cent. aqueous solution of manganese sulphate. Circulation is effected counter to

the gas and the sulphuric acid from the first tower is electrolysed to remove the manganese.

Imperial Chemical Industries, Ltd. (B.P. 430,092) scrub residual gas with cold citrate or phosphate solutions in order to absorb sulphur dioxide, which may be recovered in concentrated form by heating the solution. More lately aluminium chloride has been used as a solvent and the concentrated sulphur dioxide reduced to sulphur by passage through coke at 1,000° C.

It is much to be hoped that this or other work, which is also proceeding, will bear fruit, because the escapes from oleum plants are generally much too high and should be substantially reduced.

Chemical Manure Works

The larger chemical manure works have continued to produce superphosphate and have been somewhat busier than last year. The smaller concerns find it more economical to buy. Mixing plants and condensing towers have been maintained in satisfactory condition, and escapes have been low. The average, expressed as grains SO_3 per cu. ft., was 0.06. It is essential that the gases from mixer and den should be allowed sufficient space and time to allow all the silicon tetrafluoride to be decomposed by reaction with moisture. Provided this has been done there is no difficulty in securing almost complete removal of acid constituents. The best way in which this may be effected is to subject the gases to high pressure water sprays in void chambers followed by a packed tower to act as a spray eliminator.

A plant of the "Oberphos" type is being erected by National Fertilisers, Ltd., at Avonmouth. The works are designed for a capacity of 100,000 tons of superphosphate per year. The Broadfield mechanical dens also continue to operate well and to produce a good quality material.

Although there has been a further decrease of 17 in the number of works registered for the production of sulphate and muriate of ammonia, there has been an increase of 11 in the number of works practising the concentration of gas liquor.

Centralisation of production at the larger works continues. The smaller works are encouraged to concentrate gas liquor for subsequent conversion to salt. Concentration of gas liquor to above 20 per cent. of ammonia—with a specific gravity greater than unity—can now be accomplished by a plant which is virtually automatic in operation. Considerable saving in transport costs can thus be effected.

A new plant, brought into use in 1935, employs a fairly strong liquor, consisting almost entirely of ammonium sulphide. In view of the dangerous possibilities the plant has been most carefully designed to eliminate risk from escapes of hydrogen sulphide. An interesting feature is the use of continuous indicators which show the presence or absence, at possible danger spots, of hydrogen sulphide in toxic concentration. In addition, plant operatives are periodically drilled in the closing down of the plant and the evacuation of the immediate neighbourhood in the event of a serious escape occurring.

Nitric Acid Works

The nitric acid now used in industry is for the most part produced by the oxidation of ammonia, this process having superseded the use of nitrate of soda in the production of liquid acid and in providing the oxides of nitrogen requisite for the manufacture of sulphuric acid by the chamber process.

Special attention has been directed to the escape from a large synthetic nitric acid plant where it was found that the acidity was, at times, surprisingly high in spite of the use of alkali scrubbers. It is expected that, by arranging for a more uniform and constant feed of alkali, the figure will be reduced.

A fatality which occurred at works No. 6142 was due to inhalation of nitrogen oxides. The accident was caused by the decomposition of a pot of nitrated paper. The victim, instead of leaving the pot severely alone, attempted to drag it out into the open. Repeated warnings as to the insidious danger of nitrogen oxides have been given in previous reports. In concentrations of 100 parts or more per million they are extremely toxic.

With one exception conditions at chlorine works have been satisfactory. The exception is No. 6105—where chlorine catch towers were erected at the request of the inspector in 1933. These were quite efficient but they have been neglected and on a number of occasions during the past year there was cause for dissatisfaction. Supervision has been improved and a larger sized wash tower is now in course of erection. This will be an additional precaution, but the existing plant, carefully worked, would have sufficed.

Muriatic Acid Works

Under the Alkali Order, 1935, a number of muriatic acid processes were registered, several being in connection with the manufacture of light rubber substitute or "factice." The process consists of adding sulphur chloride slowly to an unsaturated vegetable oil which is kept constantly stirred. After a few minutes the mass suddenly swells and becomes semi-solid. A number of tests of the hydrochloric acid gas evolved have been made and these have indicated that at some works there is need for draughting and scrubbing. Water fed limestone towers are recommended. It has been noted that a good deal of fume might be avoided by the exercise of greater care in the handling of the sulphur chloride. For instance, carboys should be emptied by means of a well fitting leaden siphon.

Other registrations relate to the manufacture of triaryl phosphates by the action of phosphorous oxychloride on phenol or cresol. Suitable means for absorption of the acid gas produced have been installed.

The average of all tests made at muriatic acid works was 0.066 grain HCl per cu. ft.

Under the 1935 Order, viscose works became registrable by reason of their use of carbon bisulphide. No recovery from the xanthating churns is practised, but attention is being directed to the possibility and it is thought that a practicable process can be developed. It is even possible that recovery of carbon bisulphide from the spinning room gases may eventually become feasible.

At a new works for the manufacture of carbon bisulphide, absorption of residual hydrogen sulphide in alkali is practised. At first absorption was not complete but with subsequent adjustment the system has been made efficient and should now be satisfactory.

Paraffin Oil Works

At paraffin oil works the demand for petrol of high "octane" value has resulted in more cracking being practised, which has meant an increase in the volume of gas to be dealt with. A stabilising plant is shortly to be installed and this, it is thought, will relieve the load on the system.

The technique of petroleum refining is becoming more elaborate and is tending towards the separation and manufacture of a greater number of pure products. A recent development has been the supply of butane or "bottled gas" which is finding applications in industry as well as for domestic use in neighbourhoods which are remote from a coal gas supply.

The refinery used in connection with the coal hydrogenation plant at Billingham was started last year. A system of dealing with all tail gases is in operation and seems to be effective. These gases have not the obnoxious quality of emissions from crude petroleum refineries.

A further increase has taken place in the number of registered benzene works, of which there are now 261. The National Benzole Co.'s method for removal of carbon bisulphide from benzole is being widely used, as also is the method of Yorkshire Tar Distillers. In the former method, there is some difficulty encountered in disposing of the sodium methyl xanthate produced. It may be that this could be purified sufficiently to be used for the froth flotation process of mineral separation.

The Institute of Chemistry in the Provinces

Conference of Secretaries of Local Sections

THE Institute of Chemistry has just issued a report of the fourth annual conference of hon. secretaries of the local sections, held in London under the chairmanship of Dr. H. Burton, of Leeds. Every section of the Institute in Great Britain and Ireland was represented, and the registrar and the assistant secretary of the Institute also attended. Several problems of considerable interest to the provincial members were discussed.

The officers were asked if they could ascertain from prominent members whether they would be willing to allow their names to be placed on a short panel of lecturers, especially for the benefit of outlying districts. After discussion, it was thought better that hon. secretaries should consult the list of lectures in the annual report of the council, and should obtain from each other confidential information as to lectures which had been most appreciated. The officers considered it was unlikely that the council would agree to approach chemists directly. Well-known lecturers found it was impossible to be in readiness to give many lectures in different parts of the country during the session, but several members of the council were mentioned who had frequently lectured before the sections during the past few years.

Management of Local Sections

Some sections have, in the past, made special application to the council for the provision of lanterns, epidiascopes, and office equipment, and such requests have been sympathetically received and dealt with. It was revealed that in one section an epidiascope had been acquired, but had not been frequently used; in fact, when meetings were held in lecture theatres, lanterns and the services of a good operator could be had at little cost. In these circumstances, the outlay on expensive apparatus did not seem to be justified. In other sections, however, lanterns belonging to the sections were in frequent use.

The chairman suggested that the council would always be ready to consider reasonable requests from the sections.

One hon. secretary had suggested that, in view of the expense, the conference of hon. secretaries of local sections might be held less frequently. The officers expressed the view that the council found that the conferences had been productive of valuable suggestions. It was advantageous that the hon. secretaries should meet one another for a friendly talk and interchange of views on the management of local sections. If held less frequently, some hon. secretaries would have few, if any, opportunities of attending meetings of that kind.

It was suggested that if the annual general meeting of the Institute were held in the afternoon and a dinner in the evening, provincial members would have an opportunity of meeting one another at least once a year. The conference of hon. secretaries of local sections might also be held at about the same time.

Official Public Dinners

Several members suggested that it would be difficult for them to make arrangements to attend a conference except on a Saturday. The officers said that the arrangements of an annual meeting and annual dinner on the same day naturally increased the work of the office, but apart from that, it had been the policy of the Institute for various reasons not to hold an annual dinner—partly because of the expense and partly because of the numerous functions arranged by other chemical bodies, and the expense to the individual members who participated in such functions. The arrangements for an official public dinner involved about three months' work for three hours' enjoyment, with perhaps three inches in the daily Press on the following day. The main value of dinners was that they provided a means of bringing members together and opportunities of renewing friendships.

When the annual meeting had been held in the afternoon, it was not very well attended, but it might be said that generally the annual meetings of professional bodies were not well attended, unless the agenda included something of unusual interest.

The hon. secretary who advocated that district members of council be replaced by hon. secretaries of sections *ex officio*, contended that the secretaries had to do a great deal of work, and that it would make for efficiency if they could also be members of the council, and thus be intimately acquainted with all that was going on at headquarters. It was pointed out that associates who were hon. secretaries could not be members of the council without an alteration of the charter and by-laws.

The local sections had matters very much in their own hands. In most cases they were able to nominate the district member of council, and there was not often a ballot for an election for any district member. The suggestion that secretaries should also be members of council implied that they would have to give up time, in addition to that required for the work which they undertook locally. In some cases the district member was the chairman or hon. secretary of the local section. In all cases, the secretary could get in touch with members of council within his district for information. It was pointed out that, so far as it lay in the power of the council, an endeavour was made to secure that branches of chemical work, as well as districts, were represented.

After further discussion it was resolved that the council should consider making an alteration in the charter and by-laws so that district members of council be replaced by hon. secretaries or chairman of local sections, *ex officio*.

A short discussion took place on the subject of the nomination of district members of council in districts where there is more than one section, *e.g.*, Yorkshire—comprising Huddersfield and Leeds area; South Wales—comprising Cardiff and Swansea. It was mentioned that East Midlands and South Yorkshire would also be asked to agree to the election of one district member for the area covered by those two sections. The secretaries asked that they be specially reminded, in good time, to nominate district members.

Work of the Chemical Council

Several members of the conference having expressed a wish to know more about the proceedings of the Chemical Council, the registrar, who is also hon. secretary of the Chemical Council, gave a brief résumé of its work since its formation. It had decided on its policy and had framed standing orders; it had made temporary provision for the maintenance of the library of the Chemical Society, and its recommendations as to the constitution of the library committee had been adopted. It had framed an appeal to leaders of industry, companies and firms for the establishment of a fund to provide for the endowment of chemical publications and the future maintenance of the library, and aimed at establishing a further fund for the purpose of securing premises for the chemical societies.

In this connection the speaker mentioned that it was well known that the premises of the Chemical Society would be unable to accommodate any additional books after 1939; that the present accommodation of the Society of Chemical Industry was totally inadequate, and the lease of its present offices would expire in less than twelve months. He hoped that the secretaries of sections would do their best to encourage chemists to help these funds, for which already a substantial sum had been received or promised, mainly from chemists themselves, who hoped, by starting a preliminary

list of contributors, to encourage others to contribute. The supporters were mainly those who supported all things of this kind, but it was hoped in this case that the appeal would receive a wider response in order to place British chemistry on a sound foundation. The three chartered bodies were co-operating: there was no suggestion of amalgamation.

The small annual turnover and the comparatively small capital fund of the benevolent fund were discussed. It was suggested that greater publicity should be given to the fund.

The Registrar, as hon. secretary of the fund, informed the meeting that it was hoped next year, being Coronation year, to make a special appeal for the capital fund. The accounts for the half year ended June 30 showed an improvement on those for the first half of 1935. Experience showed that, so long as there was a useful balance on the current account, members did not respond so readily as when funds were low; so soon as the fund got into debt, and it was evident that help was urgently needed, the money came rolling in. Moreover, members who had been helped during temporary anxieties and troubles were steadily returning loans made to them.

At the moment the position was not very serious, although a good deal of money still had to be found for cases receiving regular allowances. The committee would be in a much happier position if there were a more general response on the lines suggested by several members—namely, that everyone who could do so should spare at least 5s. a year for this object. Without mentioning names the Registrar related particulars of several cases to illustrate the real need for help. He rather deprecated the raising of money at meetings because it dissuaded men who could not afford to subscribe from attending meetings, and that was most undesirable. Those who were living in comfortable circumstances could not always appreciate how frequently the private affairs of others, into which nobody had any right to inquire, determined their ability or inability to deal with the appeals to which they would be very ready to respond, if they were not obliged to maintain poor relations, pay heavy doctors' bills, or meet other like obligations.

It appeared that, apart from laboratory assistants—assistants who have matriculated and are working for degrees by means of evening classes—there are in industries, in some districts, plant-workers and foremen for whom no provision exists for technical training of any kind. Employers occasionally raise the question as to whether technical colleges could not provide courses in chemistry and engineering, especially with reference to structural materials, for foremen, process watchers, and workmen of the better type. Some expressed the opinion that such instruction was liable to be dangerous: workmen could be trained to carry out responsible operations well and regularly without mishaps; whereas a little knowledge was often a dangerous thing when exercised by those who had no real scientific training. Provision had been made for encouraging youths who had matriculated and were able to pass examinations for National Certificates. Further provision for training on the lines suggested for technical workers was not regarded as desirable, while it would be very difficult to meet the needs of various industries.

Consideration of the subject led to a reference to candidates who had obtained National Certificates and desired to proceed to the Associateship.

The assistant secretary stated that it would be difficult to frame a general ruling as to their eligibility owing to varying circumstances. Colleges were informed as to the special arrangements which could be made to meet certain cases.

Another member suggested that employers should be notified by the Institute when a member of their staff had passed the examinations of the Institute.

The Chemical Age Lawn Tennis Tournament

Provinces to be Represented in Both Finals

THE only detail that remains to be settled in connection with the finals of the sixth annual CHEMICAL AGE Lawn Tennis Tournament, to be played next Saturday, September 12, is the result of one of the two singles semi-finals, which has had to be postponed until to-day on account of holidays. As the result of the other matches in the semi-finals we are able to announce that in both the singles and the doubles, London players will try conclusions with competitors from the provinces. The finals will be as follows:—

SINGLES.

Baxter, A., United Yeast Co. Ltd. or Copp, C. G., Doulton & Co. Ltd. v. **Gough, C. C., Lever Bros., Ltd.**

DOUBLES.

Willshere, A. E. C., & Grape, L. F. Borax Consolidated, Ltd., v. **Gough, C. C., & Williams, T. P.** Lever Bros., Ltd.

Through the kindness of Sir David Milne-Watson, the finals are to be played on the sports ground of the Gas Light and Coke Company at Southend Road, East Ham (near the East Ham Underground Station), commencing at 3 p.m. promptly. Any members of the chemical industry desirous of witnessing the finals, who have not yet obtained tickets, are urged to apply to the Editor of THE CHEMICAL AGE (Central 3212) not later than midday on Monday next.

Mr. John Benn, one of the directors of Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, has consented to present the trophies at the close of the matches.

THE CHEMICAL AGE silver challenge cups will be presented to the winners of the singles and doubles respectively. Silver statuettes kindly given by Thomas Hill-Jones, Ltd., will be presented outright to the three winning players, and similar statuettes, given by Mr. W. Lloyd Willey, a director of the same company, will be awarded to the runners-up.

Three of the four semi-final matches have been played since our last issue, with the following results:—

SINGLES.—C. C. Gough (Lever Brothers, Ltd.) beat A. W. A. Goudie (Tar Residuals, Ltd.), 6-2, 6-4. A. Baxter (United Yeast Co., Ltd.) and C. G. Copp (Doulton and Co., Ltd.) are to play their semi-final to-day (Saturday).

DOUBLES.—C. C. Gough and T. P. Williams (Lever Brothers, Ltd.) beat R. D. Hayman and C. G. Copp (Doulton and Co., Ltd.), 7-5, 8-6. A. E. C. Willshere and L. F. Grape (Borax Consolidated, Ltd.) beat V. J. Prosser and A. Baxter (John Haig and Co., Ltd., and United Yeast Co., Ltd.), 6-2, 6-1.

The present position of the tournament is full of interest. Both A. Baxter and C. G. Copp, who still have to meet in the singles semi-final, are former cup holders, and an exciting semi-final is expected. C. C. Gough, who appears in the singles final for the first time, is also due to make his first appearance in the doubles final. Similar coincidences in the past afford no indication as to his possible fate. Last year J. Haines (Anglo-Iranian Oil Co., Ltd.) won both the singles and doubles; the year before, A. Baxter won the singles and lost the doubles; and in 1933 R. G. Pennington (J. Crosfield and Sons, Ltd.) lost both singles and doubles after making a special journey from the north.

A. E. C. Willshere and L. F. Grape, who won their doubles semi-final on Tuesday, defeated the same opponents at the same stage of the tournament in 1935 and then suffered defeat in the final. Their opponents at East Ham next week come from Port Sunlight. Only on one occasion has the doubles cup gone to the provinces, whilst the singles cup has been won by a Londoner each year since the singles tournament was inaugurated.

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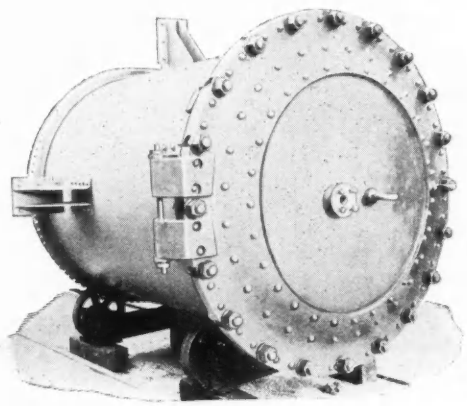

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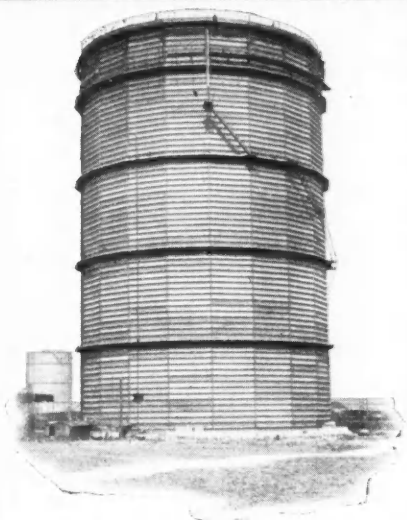

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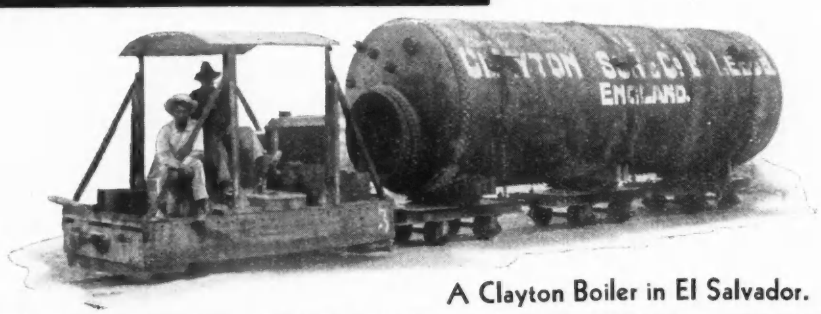

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New Technical Books

MODERN VIEWS OF ATOMIC STRUCTURE. By Karl Rast. Translated from the German by W. O. Kermack. Pp. 156. Frederick Muller, Ltd. 7s. 6d. net.

During the last fifteen years very fundamental advances have been made in our knowledge of atomic physics. Much of this is contained in highly complicated papers and books which can be understood only by the expert mathematician or physicist. The book under review, however gives the essential results of this very important development of modern physics (with the exception of one section) in non-mathematical language and so makes it possible for the non-expert reader to obtain a reasonable understanding of the structure and working of the atom. Throughout the text there does not appear to be one word which needs others to explain its meaning, and yet there is nothing superfluous to the subject. Supplementary notes have been added in order to include advances made within the year since the German text was published.

* * *

SOVIET SCIENCE. By J. G. Crowther. Pp. 342. Kegan Paul, Trench, Trubner and Co., Ltd. 12s. 6d. net.

This book describes how the reconstruction of society in Russia has affected science. Particular attention has been given to the new institutes of physics and physical chemistry, and to certain biological institutes. The author visited the Soviet Union seven times in recent years, including a long visit during the winter of 1934-35 as a guest of the Scientific Section of the Department of Heavy Industry, and of the Society for Cultural Relations with Foreign Countries. He first gives the reader a short chapter on "dialetical materialism," as scientific development in the U.S.S.R. are incomprehensible without some knowledge of this philosophy. Organisation and research in about thirty of the leading scientific institutes in the U.S.S.R. are described. There are also descriptions of the institutes and researches of such eminent Soviet scientists as Professor Joffe, N. I. Vavilov, Mandelstamm, Semenov and Frumkin, and some account of the conditions in which Soviet scientists live and work.

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EXPERIMENTS IN SPECTROSCOPY. Pp. 22. By F. Simeon, D.Sc., F.Inst.P. (Adam Hilger, Ltd.).

"The accumulated experience of every laboratory will undoubtedly suggest many alterations and additions, and the publishers will be very grateful to receive notes and criticisms which may result in an improved edition, should this one be found of any value whatever." This sentence from the preface of the book under review strikes the right note immediately, and the reader is made to understand that here is a work in the process of becoming rather than finished. Not that there is anything in it unformed or disconnected, but it is recognised that a beginning and only a beginning has been made on a vast subject. We wish the publishers every success in their endeavour to supply that which has been needed for many years past. The work itself, though slight, is concentrated, and there is no waste verbiage. Even chapters are discarded and give place to sections. In our opinion it is possible to overdo this sort of condensation, however, and division into chapters is on the whole desirable for future editions. Such would give substance and certainty not otherwise obtainable. A certain austerity of style is manifest throughout the text, and one wonders what the reaction of the average student in chemistry and physics, for whom the book is written, will be when he is faced with, say, the following: "Qualitative Spectrum Analysis: Photographic. The procedure for taking spectrograms, including a discussion of types of photographic plate, is described in Chap. 4 of the 'Practice of Spectrum Analysis' (see above)." One can imagine the student asking, "But where do the experiments come in?" Cheered the student will undoubtedly be, however, by the excellent epitomisation of the history of spectrum analysis on pages 5 and 6, but to keep his spirits up it is essential that actual examples be furnished in plenty. The book commences with Visual and Qualitative Spectrum Analysis, and goes on to Visual *Quantitative*. The next section is concerned with Absorption Spectrophotometry, and then follows the Use as Monochromator! There is, after this, a very important section on Infra-Red Experimentation, several pages of which are given up to its theoretical consideration. All this is excellent, but the experimental side seems to be pushed into the background rather than made the chief feature. The Raman effect section is better, and though short is full of interest. Measurement of Wavelength and High Resolving Power complete the book. In the last section the Leeman Effect, Use of Etalon, Echelon, etc., are considered. From the foregoing it will be seen that all classes of students are catered for. In regard to illustrations it should be mentioned that there is a very good one of the "Insta" eyepiece on page 7, but, apart from a Magian later on, this is the only example. It would be a distinct advantage if in a future edition photographs of typical apparatus used in suggested experiments were profusely introduced. Ancillary to the publication is Publication No. 241 (not 236 as stated in the Preface). It is desirable that this should be read closely in conjunction.—C. J. D. GAIR.

Synthetic Resin Information

A Survey by the Bureau of Standards

THE modern plastics industry deals chiefly with moldable materials manufactured from organic compounds. Synthetic resins, natural resins, cellulose derivatives, and protein substances are the four principal types of these organic plastics. The inorganic molding materials, such as concretes, cements, and ceramics, and also rubber (an organic substance), are not generally included within the scope of the plastic trade as it is known to-day, inasmuch as the industries utilising these materials are considerably older and were already individually organised and developed prior to the advent of the newer plastics.

In order to meet a growing demand for information regarding the organic plastics, the National Bureau of Standards, United States, has prepared a circular (C411) on this subject. The various organic plastics are discussed from the standpoint of the raw materials required, the chemical reactions involved, the various methods of processing, and the more important applications.

The synthetic resins are subdivided into several chemical types as follows: Phenalic-Aldehydic, amino-aldehydic, vinyl, hydroxy-carboxylic, indene, organic-polysulphides, and miscellaneous. Some of the more familiar industrial products which are discussed in this section of the circular are "Bakelite," "Catalin," "Beetleware," "Vinylite," "Glyptal," "Thiokol," and "Duprene." Natural resins of animal, vegetable and mineral sources are described. Typical examples of the natural resins from these three sources include shellac, rosin and asphalt, respectively. The chemistry of the cellulose esters and ethers and cellulose xanthate is outlined. "Celluloid," "Fiberloid," "Plastacele," "Tenite," and "Cellophane" are among the well-known cellulose plastics discussed. The protein plastics considered include those prepared from casein (milk), blood albumin, and soy beans. Selected references are listed at the conclusion of the circular for the convenience of the reader who may be interested in further details regarding the manufacture, properties, and uses of organic plastics.

Copies of this circular are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

The Nitrate Situation in Chile

An Outlook of Guarded Optimism

THE Chilean nitrate year, ended June, 1935, was better than any since 1931. Production amounted to 1,135,000 metric tons and sales to 1,275,000 tons. The two previous years' production had been only 536,000 and 450,000 tons, but for some years prior to 1931, production and sales had been running at about 2,500,000 tons annually.

Mr. John Mitcheson, the British Commercial Secretary at Santiago, says in his report on economic and commercial conditions in Chile (H.M. Stationery Office, 1s. 6d.) that estimates for the current year indicate a nitrate production of 1,200,000 tons, with sales at about the same figure. In other words, both production and sales are now running at about 100,000 tons a month, at which figure the industry appears to be stabilised. A return to the pre-crisis monthly rate averaging 200,000 tons is considered unlikely. It is calculated that Chile in 1935 supplied rather less than 15 per cent. of the world nitrate consumption as against about 90 per cent. in 1913. Financial results for 1935 were considered to be on the whole satisfactory, with profits amounting to £2,153,756 as compared to £1,294,948 the year before. Profits were distributed, according to the nitrate laws, as follows:—To the producers (including capital charges and depreciation), £934,387; to the Government (25 per cent.), £538,439; debentures, £680,930.

The Best Export Market

The best export market for Chilean nitrate at present is the United States to the extent, it is unofficially reported, of nearly 50 per cent. of output. In spite of the fact that artificial nitrates are produced in the United States to an increasing extent, recent reports are optimistic concerning the market for natural fertilisers. It appears that the policy of reducing cultivated areas in the United States is causing more extensive cultivation and greater use of fertilisers of all kinds.

Statistics of export by countries are not issued by the Nitrate and Iodine Sales Corporation and the following estimates for the nitrate year 1935-6 have been obtained from entirely unofficial sources and are not intended to be more than very roughly approximate. United States, 550,000 metric tons; rest of America, 150,000; Germany, 110,000; France, 55,000; United Kingdom, 35,000; rest of Europe, 50,000; Egypt, 90,000; rest of world, 160,000; total, 1,200,000.

The apparent stabilisation of the Chilean nitrate industry is believed to be due largely to the signing in July, 1935, of a three year agreement with the cartel of artificial nitrate producers. There continues to be a steady increase in employment in nitrate factories from an average of about 9,000 workers in 1933 to over 18,000 in 1935 and nearly 24,000 at present.

Shanks and Guggenheim Process

In an appendix to the report, Mr. Consul Bowering, of Antofagasta, sums up the situation as at the beginning of 1936. He says that formerly Chilean nitrate was produced in about 100 factories or "oficinas" of varying productive capacity from 12,000 to 120,000 tons per annum. The ore treated could not contain less than 15 per cent. nitrate in order to be worked at a profit and recoveries were from 55 to 75 per cent. Mining methods consisted of quarrying the ore by hand and sending to the recovery plant only the best hand-selected pieces. During 1925-26 a new oficina, "Maria Elena," was built about 75 kilometres from the port of Tocopilla, and during 1930-31 another, "Pedro de Valdivia," about 30 kilometres south of "Maria Elena" and 100 kilometres from the port of Tocopilla. These two new oficinas are of larger productive capacity than any formerly constructed in the nitrate industry —600,000 tons per annum for "Maria Elena" and 750,000 tons per annum for "Pedro de Valdiva," and they operate on entirely new principles. Ore of from 7 to 8 per cent. nitrate content can be profitably treated and recoveries are approximately 85 per cent. The old laborious methods of hand mining have been entirely replaced by mechanical shovel mining.

All nitrate produced in the Provinces of Tarapacá and Antofagasta apart from oficinas "Maria Elena" and "Pedro de Valdiva" is still elaborated under the old Shanks process and but few minor improvements have been introduced within recent years. More attention, however, is being devoted to the production of nitrate of potash on account of the premium which this product commands. In the new process, known as the Guggenheim process, the ore is crushed finer and leached with tepid solutions which are then artificially cooled to recover the nitrate. The new process differs from the old in all its mechanical features and heat recovery from solutions is one of the chief economies. The new Guggenheim process also produces its nitrate in a granulated small pellet form readily adapted for use in the farmers' drilling machines.

New Method of Shipment

At the present time about 24,000 men are employed, and the industry is in a healthier condition than at any time since 1930, although it is true that the sales amounting to 1,200,000 tons are only about half what they were in the best former years, while the price is still very low. Chilean coal has to all intents and purposes replaced petroleum as the fuel used in the elaboration of nitrate, the cost of petroleum being prohibitive on account of the heavy import duties which have been imposed. Moreover, nowadays most of the nitrate produced is shipped in bulk instead of, as formerly, entirely in bags. It is discharged from the railway cars into lighters alongside the wharf and thence to the loading vessel in the bay.

Among the worst difficulties with which the industry has to contend are the quota arrangements established by the various consuming countries to foster their own synthetic nitrogen industries. Many farmers continue to prefer Chilean nitrate of soda to all other nitrogenous fertilisers, but it is difficult to supply them because of the artificial barriers set up in their respective countries. On the whole, however, the worst of the crisis seems to have passed and the outlook for the industry is now one of guarded optimism.

Sulphur Production in Chile

Immense Undeveloped Deposits

ACCORDING to a report on economic and commercial conditions in Chile by Mr. John Mitcheson, British Commercial Secretary at Santiago, just issued by the Department of Overseas Trade (H.M. Stationery Office, 1s. 6d.). Production of refined sulphur in Chile in 1935 was estimated at approximately 16,000 tons as against 20,683 in 1934, the reduction being due to the failure and closing down of an important mining concern at Arica, under United Kingdom management. Arrangements for the reopening of this mine are reported to be under discussion. In the meanwhile considerable progress is being made in the development of sulphur properties near Iquique and Antofagasta and refining plants have been constructed with indirect financing by the State. It is therefore probable that Chilean sulphur production and export will increase over the next few years. The new refining factory at Ollagué, near the Bolivian frontier, inland from Antofagasta, is to have a capacity of 300 tons a day, but recent difficulties are reported in connection with the operation of this plant.

New Glasgow Benzole Plant

To Yield 2,500 Gallons per Day

A NEW benzole recovery plant was set in motion at the Glasgow Corporation gasworks at Provan on Friday, August 28, by Lord Provost Mr. John Stewart. The plant has been installed by Newton, Chambers and Co., Ltd., and is designed to deal with 14,000,000 cu. ft. of gas per day from Woodall-Duckham continuous vertical retorts, and to yield 2½ gal. of benzole per ton of coal carbonised or 2,500 gal. per day. An up-to-date feature of the plant is the centralised control house, on the roof of which stands the still and in which are erected all automatic control valve regulators, distance thermometers, pressure gauges, steam and oil flow meters, and dual recording thermometers.

It is anticipated that the annual production of crude benzole from the plant will be of the order of 600,000 gal., a portion of which will be used in the adjoining chemical works belonging to the Glasgow Corporation for the process of dephenolating effluent liquors. Without treatment the effluent from the ammonia plant causes difficulties at the Glasgow sewage disposal works. It is intended to market the bulk of the material as motor spirit.

Activated Carbon Patents

Infringement Affirmed

A DECISION rendered by the United States Circuit Court of Appeals for the Second Circuit, on August 10, affirmed a decree of the United States District Court for the District of Connecticut of May, 1935, which held that certain claims of U.S. Patents Nos. 1,497,543 and 1,497,544, covering activated vapour adsorbent carbon, were valid and infringed. The suit was brought by the National Carbon Co., Inc., a unit of the Union Carbide and Carbon Corporation, against Richards and Co., Inc., and the Zapon Co., of Stamford, Conn., because the two latter companies were using for solvent recovery activated coconut carbon which had been made by the Barnebey-Cheney Engineering Co., of Columbus, Ohio.

United States District Judge Hincks held that this constituted infringement of the plaintiff's patent claims which he found valid. He rendered judgment in favour of the plaintiff for $24,410.65 on account of the infringement.

In rendering the decision affirming the decree of the District Court, Circuit Judge Swan stressed the fact that the defendants were not charged with infringement of the patented process but with infringement of certain product claims by the use of infringing carbon in their business. This point was further emphasised in the decision as follows: "It was proved that the defendants, with knowledge that they would be charged with infringement, purchased from the Barnebey-Cheney Engineering Co. carbon that was known as '60 Minute Adsorbite.' Though in part hearsay, this evidence was admitted prior to objection and no motion was made to strike it out. Dr. Ray testified that he had tested '60 Minute Adsorbite' of the Barnebey Co. and found it to infringe the claims in suit. Furthermore, Dr. Ray give his opinion as an expert, based on Mr. Creighton's description of the defendants' cycles of operation and efficiency of recovery, that any carbon so operating infringed the claims. His testimony was not even subjected to cross-examination. On this record the plaintiff made out a prima facie case of infringement."

In THE CHEMICAL AGE report of the decision of May 13, 1935 (June 22, 1935, page 557), it was stated that the Chaney patents were based on the war-time discoveries of Dr. N. K. Chaney and his associates in the National Carbon Co., Inc.—discoveries that assured an ample supply of highly efficient gas-mask carbon at a time when the need was most urgent. After the war, it was found that this highly activated carbon was equally efficient for a variety of peace-time uses. In 1919, the National Carbon Co., Inc., began the manufacture of activated carbons by the Chaney process for industrial use. Marketing of these products is handled by Carbide and Carbon Chemicals Corporation, also a unit of Union Carbide and Carbon Corporation, which furnishes equipment and technical service in solvent recovery and gas purification. Activated carbon has proved an efficient and long-lived adsorbent material for recovering gasoline and other constituents from natural gas, and for recovering solvents from air mixtures in the manufacture of rayon, artificial leather, coated fabrics, coated paper, transparent wrapping materials and many other products.

Coal, Coke and Coal Ash

British Standard Methods for Analysis

As part of the work that is being carried out in regard to the preparation of British Standards for the sampling and analysis of coal and coke, the British Standards Institution have just issued British Standard methods for the ultimate analysis of coal and coke and for the analysis of coal ash and coke ash.

Coal ash, as prepared in the laboratory by the incineration of powdered coal in an oxidising atmosphere at a temperature of about 800° C., consists mainly of oxides of silicon aluminium, calcium, magnesium and iron, with smaller amounts of the alkalies, and usually some sulphates. The recognised analytical methods for the quantitative analysis of mixtures of inorganic oxides are applicable in the usual way to the major constituents, the chief difficulties being overcome by observing certain precautions. In addition to the major constituents, coal ash contains smaller and variable amounts of other constituents which may have an important bearing upon the properties and uses of the coal.

The methods for the analysis of coal ash and coke ash, B.S.S. No. 686-1936, have been largely based on the methods recommended by the Department of Scientific and Industrial Research in Fuel Research Paper No. 28, "Methods for the Quantitative Analysis of Coal Ash," by Dr. J. G. King and Mr. H. E. Crossley. Methods are included for the determination of silica, iron, titanium and aluminium, calcium and magnesium, manganese, sulphur trioxide, alkalies and phosphorus.

The first short course of analysis, which has been termed "The Rational Method of Analysis of Coal Ash," has been largely based on the work carried out by Dr. Lessing. It aims at a rapid determination of the main characteristics of an ash, and is based on the sub-division of the ash into three fractions: (1) soluble in water; (2) insoluble in water but soluble in hydrochloric acid; (3) insoluble in hydrochloric acid. A shortened method of ash analysis is also included, which cuts down considerably the time taken by the standard method. The shortened method provides for the determination of silica, alumina (together with titania and combined phosphoric oxide), ferric oxide, calcium oxide, alkalies, sulphur trioxide, the balance of the ash being assumed to be magnesium oxide, mangano-manganic oxide, etc.

The standard methods for the ultimate analysis of coal and coke, B.S.S. No. 687-1936, include determinations of carbon and hydrogen, nitrogen, sulphur, phosphorus, arsenic and chlorine, while methods are included in appendices for the determinations of carbon dioxide and of "sulphate" and "pyritic" sulphur in coal.

THE first plantings of tung trees in New Zealand commenced during the winter season of 1932. Since that time plantings have increased and the total acreage under cultivation is now 2,500, all of which is owned by the New Zealand Tung Oil Corporation, Ltd. While no commercial crop is expected before 1938, a large percentage of the trees has already reached the bearing stage and it is expected that production of the oil will start ahead of schedule. This season it is planned to add at least 500 acres to the groves now under cultivation.

Importance of Budgetary Control

By S. HOWARD WITHEY, F.C.I.

DURING the past year many chemical manufacturers of established reputation have experienced serious financial difficulties arising from failure to institute a sound directional policy or an effective method of internal orgaisation and control. Both small and large concerns have suffered, some being no longer in existence, and there are many others that find it increasingly difficult to adapt themselves to the rapid changes which are taking place in selling methods.

Under existing economic and trading conditions scientific management is essential, and no business can be conducted with continued success unless future operations covering a definite period are subjected to a careful and systematic planning on the part of the managers and executives, followed by the adoption of appropriate methods of accounting and costing to enable all necessary adjustments to be made in the procedure, and all errors in policy to be rectified in good time.

The Plan of Operations

The viewpoint that budgetary control converts business management into a kind of mechanised or mechanical operation cannot be supported. Personal initiative is in no way limited or starved by the adoption of methods specially designed to aid control or to indicate the steps to be taken in order to cope effectively with impending developments; neither is individual enterprise in any way crippled by reason of the co-ordination of all departments in the carrying out of a predetermined plan based on estimates. At the same time, it is possible to over-emphasise certain aspects, but this can be avoided. The plan of operations for the business as a whole should cover a definite period, such as one year, six months, or three months, and in this article it is proposed to indicate the fundamental requirements of control as applied to sales, production and finance, and the practical work to be undertaken by the costing department in the compilation of materials costs, labour costs, estimates of overhead and operating expenses, and other items capable of classification.

Business for the Coming Year

In determining the volume of business for the coming year, reports will be needed from the managers and foremen whose duty it is to carry out the manufacturer's general policy; in this connection, while the judgment of managers may usually be acted upon, the opinions expressed by foremen may have to be considered very carefully as they cannot always be accepted. By reason of their position, managers are able to draw on facts as furnished by the accounts department, and such information, side by side with analyses of general business and economic conditions, will greatly facilitate the preparation of an estimate which can be subdivided geographically or into periods of time by reference to the particular class of product or products.

By ascertaining the volume of output over a number of years and converting these figures into index numbers, allowance can be made for publicity schemes, volume of purchasing power, and methods adopted by competitors in the same areas, in order to forecast the curve for the coming year. Manufacturers of standard products usually commence their budget operations with a geographical classification of sales, a certain area, such as a county, being taken as a unit, and its population and buying power ascertained to arrive at a percentage of the total business which it is expected to transact.

Rises and falls in turnover in relation to, say, labour costs, can often be more effectively displayed by the use of graphs than by statistical returns. Broadly speaking, graphs or line charts may be divided into two categories, one showing the amount of change and the other indicating the rate of change. The former usually takes the form of a number of points joined together by a line, the variations in the figures being revealed by the rising or falling of the line; it can be modified in many ways. The scales may be laid down the left-hand margin of the paper, and also at the foot, thus leaving the entire chart field available for the diagram.

Having estimated with reasonable accuracy the amount of work he expects to complete, the manufacturer on a small scale may find it possible to make up a simple budget by showing the percentage relation of each group of expenditure to the total turnover. For this purpose the expenditure should be classified into materials cost, labour cost, fixed expenses, and overhead expenses. In proportion to the turnover, some of the expenses may remain fairly constant throughout, while others may show wide variations, but from the financial accounts the main elements can be outlined to indicate the probable profits and to enable reliable comparisons to be made.

Two Groups of Business Concerns

Broadly speaking, business concerns may be grouped under two headings—(1) Firms that expect to obtain orders in advance. (2) Firms that produce to definite orders and specifications as they come to hand. In some instances it is possible to estimate the fortscoming demand by ascertaining the percentage growth of past turnovers, and by increasing the past year's production figure by a similar percentage. This method of gauging future demand is not very scientific, as conditions do not remain static, and many schemes are subject to considerable change which has the effect of altering the relationship between the number, weight or quantity of materials and stores bought for stock and process, and the rate of output.

Under prevailing trade conditions several factors demand consideration in attempts to plan operations on the basis of the probable volume of business that will be transacted during a particular period. Past results must be studied very carefully in relation to the orders and inquiries received; market prospects must be analysed in the light of the reports received from representatives and local agents; and the labour situation and the firm's finances must be taken into account. On these lines a general budget can be prepared, the accuracy of the final result depending mainy on an intelligent dissection of the figures relating to previous periods, and a comprehensive appreciation of the economic influences on turnover. All are effected, in greater or lesser degree, by seasonal variations and periodical booms and slumps, and also by influences which are incapable of prediction. The extent to which these factors can be determined will govern the accuracy of the estimate of the business trend during the year. In this connection it should be mentioned that constant forecasting now enables many firms in the industry to draw up production programmes with a margin of error of less than 1 per cent.

Predicting Probable Sales

The probable sales of different kinds of products can be predicted by ascertaining the trend of expansion, and by preparing a curve showing business cycle movements. The form will depend largely upon the nature of the information desired by the functional managers, and as the costs of selling are closely related to the sales data, the planning of a sales programme would be of little practical utility unless an estimate is made of the selling expenses. The object of selling is to realise a profit, and if expenditure is not effectively controlled no satisfactory results can be obtained. The salaries, commissions and expenses of salesmen, the office expenses, packing and transport charges, and the cost of advertising, publicity and other marketing methods may be budgeted separately and incorporated in a master budget provided with

columns or sections for the insertion of the average sales and expenses for a period of years, the percentage relation of each item of selling expense to net sales, the estimate for the coming year or period, and the expense actually incurred.

The main factors to be considered in the preparation of a production budget are the number of units required, the cost of materials to be used, the cost of direct labour, the indirect labour cost, works burden and overhead charges, and the total cost. The result may be achieved by means of several subshidiary budgets, and in many large works at the present time there are separate planning statements for estimating the cost of supervision, repairs and maintenance, depreciation, power, heating and lighting, taxes and insurances, etc.

The efficient control of materials and stores will ensure that the inventory is not inflated as at the balancing date, the procedure usually adopted when budgeting being to deduct the estimated stock requisitions from the inventory as at the start of the period, the resultant figure being deducted from the inventory as at the end of the period. The materials budget form may be ruled with columns for showing the estimated and actual withdrawals from stock, and the estimated and actual expenses in handling the materials.

In works research and general laboratory work the principal charge is that for salaries and wages. These should be debited to the productive departments on a percentage ratio varying according to the number of hours spent by the officials in each department. The direct works expenses can be allocated by the engineers, the wages department and general stores, while the indirect expenses can be debited to the departments in the same proportions as the net amounts paid away during the past year bear to the total. Production managers and planning departments usually prefer the orders in hand to be expressed as a percentage of the output.

Personal Notes

Lord and Lady TRENT have given £100 to the Notts County Association of Social Service Centres, of which the Duchess of Portland is president.

MRS. JANE SMEAL THOMPSON, of Elrick, Manor Way, South Croydon, Surrey, and formerly of Hampstead, widow of Professor Silvanus P. Thompson, left £28,204, with net personalty £27,030.

Dame ADELAIDE MARY ANDERSON, whose death took place on August 28 in London at the age of 73, was the first woman inspector of factories, when she was appointed in 1893. A few years later, when there were more women inspectors, she was created H.M. Principal Lady Inspector of Factories.

Sir FREDERICK JOHN JONES, Bart., of Irnham Hall, Grantham, a director of the United Steel Companies, and several other companies, left gross estate value £186,957. Sir Frederick John Jones was twice president of the Mining Association and for twenty-one years chairman of the South Yorkshire Coal Trade Association.

Dr. R. H. PICKARD, president, has promised to deliver the 1936 Gluckstein Memorial Lecture to the Institute of Chemistry on November 5.

Mr. HENRY ROBERT HEWITT, of 74 Gainsborough Road, Blackpool, retired chemical manufacturer, left £6,234, with net personalty £6,154.

Dr. EDGAR REGINALD DEACON, of Chedzoy, Glenesk Road, Eltham, died on August 29 aged fifty-four. Dr. Deacon was in charge of the high-explosive section incorporated in the Directorate of Explosive Research in the Research Department at Woolwich. During the early days of the war he discovered how to use amatol in filling shells. The explosive was known in this country, but the method of using it could not be ascertained. The difficulty was overcome by the research work of Dr. Deacon, who discovered a method of applying amatol to active military purposes. He was a member of numerous committees connected with the Admiralty, War Office and Air Ministry on defence matters.

Chemical Notes from Foreign Sources

Germany

WITH A SHARE CAPITAL OF 42,000 MARKS, the Biotechnik Gesellschaft für biologisch-chemische Raffinierung G.m.b.H. has been registered in Berlin. It is intended to exploit a process for improving the flavour and odour of foodstuffs, fodder, medicines and the like.

France

RECENT COMPANY FORMATIONS include: Pharmacie Champerret, Paris (capital, 150,000 francs); Pansement Hydrex, Montreuil-sous-Bois (capital, 780,000 francs), manufacturers of pharmaceutical products; Soc. des Produits Chimiques pour l'Industrie textile, Neuilly-sur-Seine (capital, 25,000 francs), manufacturers of textile assistants; Les Terres Fransil, 2 rue Lord-Byron, Paris (capital, 2 million francs), manufacturers of bleaching earths.

Roumania

SOLE PROSPECTING RIGHTS FOR BAUXITE in the districts of Sohodol and Ponorel have been sold to the Roumanian "Aur" Co. by the Anglo-International Bank of London.

THE AERO-CHIMICA CO., recently registered in Bucharest, will manufacture products for combating poison gas attack from the air, and has instituted free training courses in their utilisation.

THE PHOENIX CHEMICAL CO., of Baia-Mare, which started to cater for the bleaching earth requirements of the Roumanian mineral oil industry last year, is now contemplating the development of an export trade.

Italy

THE PROBLEM OF SYNTHETIC RUBBER MANUFACTURE is understood to have been finally solved in the technical sense by the Pirelli Co., who, as already reported, convert acetylene into butadiene by way of an acetaldehyde-ethyl alcohol condensation reaction, but price considerations are at present a bar to the exploitation of the method.

RECENTLY AUTHORISED CHEMICAL ENTERPRISES include: Plant for chlorinated naphthalenes (Soc. Lavorazione Olii Industriali An., Ravenna); erection of a plant at Pompeii for preparing liquid and solid carbon dioxide from a natural source (Soc. Italiana Sorgenti Carboniche, Rome); a department for production of calcium, potassium and sodium hypophosphites at the Spoleto works of Soc. An. Fosforo e Derivati, Milan.

EQUIPMENT FOR THE NEW SULPHURIC ACID PLANT of the S.A. Chimiche Dr. Baslini is notable for its departure in many features from European practice. Sulphur dioxide is produced by combustion of sulphur in a completely enclosed furnace using air pre-dried by passage through a concentrated

sulphuric acid tower. The sulphur melting plant is devised so as to effect almost complete elimination of the mechanical impurities present in Sicilian sulphur. After partial cooling, the gas is passed to the contact chambers, of which there are two in series, the second having almost twice the capacity of the first. Two heat exchangers are also attached to this unit. Several years' experimenting preceded final selection of the contact mass which is on the basis of vanadium oxides precipitated on a special porous support, conferring, it is claimed, a uniformly high activity both superficially and in the interior of the mass. With a gas containing between 7 and 8 per cent. sulphur dioxide, the transformation yield in the catalyst chambers operating on a daily throughput of 10 tons actually exceeds 98 per cent., while it has even been possible to increase the daily production to 15 tons without reducing the catalytic yield by more than one per cent. Following the catalytic reaction the gases pass through an air-cooled chamber before entering the absorption plant which comprises a horizontal absorber for oleum and two absorption towers for monohydrate. A full, illustrated description of the plant appears in the August issue of "La Chimica e L'Industria."

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

Methods and apparatus for the destructive distillation of solid or pasty carbonaceous materials.—Physical Chemistry Research Co. Feb. 21, 1935. 23240/35.

Manufacture of poly-coloured artificial materials from fibrous materials and hardenable synthetic resins.—Albert Products, Ltd. Feb. 21, 1935. 35838/35.

Respiratory equipment, more particularly for use with gas masks or the like.—Soc. Anon. Des Gaz Industriels S.O.G.A.Z. Feb. 23, 1935. 36089/35.

Preparation of 1 : 1-dichlorethane.—Consortium Für Elektro-Chemische Industrie Ges. Feb. 22, 1935. 4122/36.

Pigmental colouring matter.—W. Mühlberg. Feb. 19, 1935. 4364/36.

By-3-oxytetrahydro-oxynaphthoquinolines.—I. G. Farbenindustrie. Feb. 20, 1935. 4376/36.

Conversion of hydrocarbon oils.—Universal Oil Products Co. Feb. 18, 1935. 4850/36.

Process of dyeing.—Aceta Ges. Feb. 21, 1935. 4912/36.

Polymerised esters of methacrylic acid and compositions containing the same.—E. I. du Pont de Nemours and Co. Feb. 19, 1935. 4956/36.

Cracking of mineral oils.—Standard Oil Development Co. Feb. 21, 1935. 5050/36.

Esters of the thio-acids of phosphorus and their manufacture.—E. I. du Pont de Nemours and Co. Feb. 19, 1935. 5088/36.

Means for preventing the formation of ice on exposed surfaces.—Harshaw Chemical Co. Feb. 20, 1935. 5131/36.

Deasphalting and dewaxing of hydrocarbon oils.—E. Petty, and M. B. Cooke. Feb. 21, 1935. 5204/36.

Process and apparatus for calcining lithopone.—Sachtleben A.-G., Für Bergbau und Chemische Industrie. Feb. 21, 1935. 5207/36.

Preparation and preservation of vitamin-containing foods. Soc. Anon Vitabana. Feb. 21, 1935. 5319/36.

Production of cellulose ethers.—E. I. du Pont de Nemours and Co. Feb. 23, 1935. 5532/36.

Applications for Patents

(August 20 to 26 inclusive.)

Synthetic moulding materials.—Bakelite, Ltd. (Germany, Sept. 3, '35.) 23,454.

Manufacture of synthetic resin products.—Bakelite, Ltd. (Bakelite Ges.). 23,254.

Manufacture of rubber-paracoumarone-resin composition.—Barrett Co. (United States, Aug. 26, '35.) 23,455.

Refining of lead.—W. T. Butcher, Goodlass Wall and Lead Industries, Ltd. (Sept. 12, '35.) 23,202.

Process for the electrolytic manufacture of hyposulphite. A. Carpmael (I. G. Farbenindustrie). 22,952.

Manufacture of water-insoluble dyestuffs.—A. Carpmael (I. G. Farbenindustrie). 23,151.

Provision of hydrocarbons with distinctive colourings.—A. Carpmael (I. G. Farbenindustrie). 23,241.

Manufacture of copper oxychloride.—A. Carpmael (I. G. Farbenindustrie). 23,351.

Equalising masses for X-ray irradiation.—A. Carpmael (I. G. Farbenindustrie). 23,352.

Process for dyeing cellulose.—A. Carpmael (I. G. Farbenindustrie). 23,405.

Manufacture of sulphonic acid amide compounds.—A. Carpmael (I. G. Farbenindustrie). 23,406.

Conversion of alkaline chlorides into carbonates:—A. Cousalvo. 23,475.

Separation of soluble and valuable constituents from sylvinite ores.—F. B. Dehn (Potash Co. of America). 23,468.

Vulcanisation accelerators.—Dunlop Tyre and Rubber Corporation. (United States, Sept. 20, '35.) 23,285.

Treatment of hides, etc.—W. W. Groves (I. G. Farbenindustrie). (Jan. 21, '35.) 22,945, 22,946.

Manufacture of acid wool dyestuffs of the anthraquinone series.—W. W. Groves. 22,947.

Manufacture of cellulose wool.—W. W. Groves. 23,145.

Manufacture of disazo-dyestuffs.—W. W. Groves. 23,230.

Manufacture of oxazines of the anthraquinone series.—W. W. Groves. 23,320.

Manufacture of dyestuffs of the anthraquinone series.—W. W. Groves. 23,426.

Manufacture of vat dyestuffs.—I. G. Farbenindustrie. (Germany, Aug. 22, '35.) 23,231.

Production of magnesium oxychloride.—I. G. Farbenindustrie. (Germany, Jan. 4.) 23,365.

Manufacture of synthetic resinous materials.—Imperial Chemical Industries, Ltd., E. B. Robinson, H. A. Hampton, A. Hill. 23,091.

Heat treatment of metals.—Imperial Chemical Industries, Ltd., J. C. Bailey and H. W. Brownsdon. 23,092.

Polymerisation of olefines.—Imperial Chemical Industries, Ltd., J. G. Paton, M. W. Perrin and E. G. Williams. 23,093.

Gas-evolving compositions.—Imperial Chemical Industries, Ltd., J. Taylor. 23,094.

Anthraquinone dyestuffs.—Imperial Chemical Industries, Ltd., R. J. Loveluck. 23,265.

Manufacture of polymerisation products.—Imperial Chemical Industries, Ltd., B. J. Habgood, R. Hill and L. B. Morgan. 23,317.

Dyeing of leather.—G. W. Johnson (I. G. Farbenindustrie). 23,035.

Production of vat dyestuffs of the dibenzanthrone series. G. W. Johnson (I. G. Farbenindustrie). 23,130.

Production of condensation products.—G. W. Johnson (I. G. Farbenindustrie). 23,131.

Process for obtaining alcohol free from nitrogen bases.—Naamlooze Vennootschap Internationale Suiker en Alcohol Compagnie International Sugar and Alcohol Co. Isaco. (Germany, Aug. 22, '35.) 23,272.

Process for evaporating hydrochloric acid wood sugar solutions.—Naamlooze Vennootschap Internationale Suiker en Alcohol Compagnie International Sugar and Alcohol Co. Isaco. (Germany, Aug. 22, '35.) 23,273.

Production of composite pigments.—Titan Co., Inc. (United States, Aug. 24, '35.) 23,144.

Production of chemical compounds from diamino-alpha-picolines.—W. R. Warner and Co., Ltd. (United States, Dec. 24, '35.) 23,331.

Specifications Accepted with Date of Application

Esters of polyglycerols.—A. F. Burgess (Emulsol Corporation). Nov. 10, 1934. 452,138.

Manufacture of wetting, cleansing and dispersing agents.—Imperial Chemical Industries, Ltd., and A. W. Baldwin. Nov. 12, 1934. 452,139.

Anthraquinone dyestuffs.—Imperial Chemical Industries, Ltd., N. H. Haddock, F. Lodge, and C. H. Lumsden. Nov. 14, 1934. 452,203.

Porous consolidated products of metal and/or metal carbides.—V. Sauter, and F. Klonnek. Nov. 19, 1934. 452,411.

Azo-dyestuffs on animal fibres.—W. W. Groves (I. G. Farbenindustrie). Dec. 12, 1934. 452,142.

MANUFACTURE OF CYANINE DYES and of sensitised photographic emulsions.—W. W. Groves (I. G. Farbenindustrie). Nov. 15, 1934. 452,408.

PRODUCING PERSILICATES OF INCREASED STABILITY with high content of hydrogen peroxide or active oxygen.—Dr. F. Krauss. Dec. 15, 1933. 452,144.

MANUFACTURE OF FREE ω-METHANE-SULPHONIC ACIDS OF PYRAZOLONE-AMINES.—I. G. Farbenindustrie. Jan. 13, 1934. 452,363.

MANUFACTURE OF CYANHYDRINS.—Triplex Safety Glass Co., Ltd., and J. Wilson. Jan. 19, 1935. 452,285.

DYESTUFF MIXTURES.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Feb. 15, 1935. 452,421.

PROCESS FOR DESULPHURISING GASES.—Studien-und Verwertungs-Ges. Jan. 31, 1934. 452,417.

MANUFACTURE OF DYESTUFFS of the anthraquinone series.—W. W. Groves (I. G. Farbenindustrie). Feb. 16, 1935. 452,424.

ARSENOBENZENE-MONOSULPHOXYLATES.—I. G. Farbenindustrie. March 10, 1934. 452,153.

PLANT FOR THE MANUFACTURE OF SOAP.—L. S. Harber, J. E. Pointon, Baker Perkins, Ltd., and Anciens Etablissements A. Savy, Jeanjean, and Cie. Feb. 18, 1935. 452,287.

HIGH MOLECULAR ORGANIC SULPHUR COMPOUNDS.—I. G. Farbenindustrie. Feb. 17, 1934. 452,215.

PURIFICATION OF CAUSTIC SODA SOLUTIONS.—Pennsylvania Salt Manufacturing Co. Feb. 17, 1934. 452,218.

PROCESS OF SENSITISING PHOTOGRAPHIC EMULSIONS and the manufacture of dyestuffs therefor. W. W. Groves (I. G. Farbenindustrie). Feb. 19, 1935. 452,426.

PRODUCTION OF BENZINES from middle oils by destructive hydrogenation.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). Feb. 20, 1935. 452,429.

MANUFACTURE OF NITRO-COMPOUNDS and amino-compounds of substituted benzotrifluorides.—W. W. Groves (I. G. Farbenindustrie, A.-G.). Feb. 21, 1935. 452,436.

COLOURING RUBBER.—Coutts and Co., and F. Johnson (Legal representatives and J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Feb. 21, 1935. 452,438.

MANUFACTURE OF HIGH MOLECULAR PRODUCTS containing sulphur. I. G. Farbenindustrie. Feb. 21, 1934. 452,441.

TREATMENT OF VITAMIN-CONTAINING OILS and products obtained therefrom.—H. I. Waterman, C. Van Vlodrop, J. A. Van Dijk, and Imperial Chemical Industries, Ltd. Feb. 21, 1935. 452,442.

ACYL DERIVATIVES OF GERMINAL GLAND HORMONE PREPARATIONS.—Schering-Kahlbaum, A.-G. Feb. 22, 1934. 452,447.

MONOAZO DYESTUFFS.—I. G. Farbenindustrie. Feb. 24, 1934. 452,454.

TRIS- AND TETRAKIS-AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). Feb. 25, 1935. 452,300.

CARRYING OUT CATALYTIC REACTIONS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Feb. 27, 1935. 452,158.

APPARATUS FOR THE MANUFACTURE OF ALKALINE LIQUORS or salt solutions.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Mar. 2, 1935. 452,302.

APPARATUS FOR STERILISING LIQUIDS.—B. H. Auld. Apr. 8, 1935. 452,456.

MANUFACTURE OF AZO DYESTUFFS.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Apr. 26, 1935. 452,326.

MERCERISING LYES.—Deutsche Hydrierwerke, A.-G. May 8, 1934. 452,226.

ALKYLATED PHENOLS.—W. W. Groves (Monsanto Chemical Co.). June 5, 1935. 452,335.

CITRACONIC AND ITACONIC ACIDS, and anhydrides.—C. H. Boehringer Sohn, A.-G. July 7, 1934. 452,460.

CHROMABLE AZO DYESTUFFS of the pyrazolone series.—Chemical Works formerly Sandoz. July 17, 1934. 452,234.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Aug. 16, 1934. (Cognate Application 22988/35. 452,344.

PURIFYING PROGESTERONE PREPARATIONS.—Soc. of Chemical Industry in Basle. Aug. 24, 1934. 452,238.

MORDANT DYESTUFFS.—Durand and Huguenin, A.-G. Sept. 5, 1934. 452,346.

HEAT-TREATMENT OF MAGNESIUM ALLOYS susceptible to precipitation hardening.—I. G. Farbenindustrie. Dec. 15, 1934. 452,390.

HYDRATED MAGNESIUM SILICATE DECOLOURISING MATERIALS.—L. Caldwell. Dec. 1, 1934. 452,247.

PRODUCTION OF POTASSIUM FORMATE.—Chemische Fabrik Buckau. Jan. 31, 1935. 452,471.

Chemical and Allied Stocks and Shares

THERE has been an increase of business reported in the industrial section of the Stock Exchange, and movements in share values have mostly been in favour of holders. Imperial Chemical have made a satisfactory recovery on the week from 39s. 6d. to 39s. 10½d. and the deferred shares remained at 9s. 9d. It is possible the interim dividend on the ordinary shares may be announced shortly. B. Laporte remained steady at 130s. There are anticipations current in the market that the interim dividend may be raised, but the high level of the shares is generally attributed to the possibility that a bonus of some kind may be forthcoming eventually. British Drug Houses were around 19s. 6d. at which they offer an apparently attractive yield of 5 per cent. Sangers have recovered from 28s. 4½d. to 28s. 7½d. It is believed in the market that fuller benefits from the company's more recent acquisitions will be reflected in the profits for the current year and that if further expansion of the business is contemplated there may be the possibility of shareholders being offered further ordinary 5s. shares on favourable terms. The authorised capital was increased earlier in the year. It has to be remembered that there has been no official statement of any kind indicating that an issue of this sort is contemplated.

Salt Union were again steady around 43s. Prior to the depression dividends of 12½ per cent. were forthcoming, and as time proceeds the dividend may well be restored to this level, bearing in mind the possibility that later on profits may be dealt with less conservatively. Unilever were unchanged at 34s. 6d. Whilst the assumption in the market is that the profits are probably on the up-grade there is considerable divergence of opinion as to how earnings will be affected by the upward movement in the prices of East African produce. It is quite likely that in recent years profits have been struck after providing for the writing down of stocks to market values and that no such provision will be necessary on this occasion. Erinoid were steady and unchanged, awaiting the past year's results as were Fison, Packard and Prentice.

Cooper, McDougall and Robertson have risen further from 38s. to 39s. at the time of writing, awaiting the interim dividend announcement. There was a steady tendency in the 5s. ordinary shares of United Premier Oil and Cake which have remained around 12s. 1½d. Last year's dividend was conservative but it was accompanied by a share bonus. It is possible that the forthcoming interim dividend may be increased, and there are also hopes in the market that the payment of a moderate share bonus with the final dividend may also be continued. The preferred ordinary stock units of British Oil and Cake Mills have moved up further from 50s. to 50s. 3d. the apparently very generous yield on the basis of the 12½ per cent. dividend having continued to bring in more buyers. Staveley Coal and Iron shares did not hold best prices, but the larger dividend created an excellent impression in the market. Consett Iron shares were in request on any reaction in price. The results of the latter company for the current year will be the first to reflect the drastic reorganisation of the capital, and having regard to the probability that the good advance in profits shown for the previous year is being at least maintained, there are general expectations in the market that a good dividend is in prospect.

Dorman Long ordinary shares recovered from their recent reaction and are now 40s. 6d. This is another company which is expected to show the resumption of dividends in its next report and which has reorganised its capital. There are hopes in the market that the dividend may be as much as 10 per cent., but this appears to be on the optimistic side, having regard to the official indications given earlier in the year that a conservative policy is likely to be continued. Many of the leading iron, steel and allied companies have large works extensions in hand and as a result the tendency is to conserve cash resources as much as possible. Imperial Smelting Corporation ordinary shares have gone back from 16s. 3d. to 15s. 9d., but the market is still hopeful of a dividend for the past financial year.

Associated Portland Cement (which were again aided by hopes of a larger interim dividend) were strong in common with other shares of cement manufacturing companies, sentiment having benefited from the news of a move to secure more uniform prices for cement throughout the country, thus lessening the danger of excessive competition. International Nickel were higher; there is already talk in the market of another good increase in the quarterly dividend. Greeff-Chemicals Holdings remained at 9s. and the preference at 11s. 10½d. Timothy Whites and Taylors were active and held the higher price of 30s. 3d. made recently.

British Oxygen were again active. The yield on the basis of last year's 15 per cent. dividend is small, but the market is confidently expecting a larger dividend for the year and there is already talk of an increased interim payment. There was some profit taking in Murex, but Turner and Newall remained a prominent and active feature. "Shell," Anglo-Iranian and other leading oil shares were well maintained. Pinchin Johnson were moderately lower despite the maintenance of the interim dividend and the official statement that sales have continued to increase. Most other paint shares were steady.

From Week to Week

THE AUSTRALIAN IRON AND STEEL CO. propose to spend £1 million on new plant at Port Kembla. Most of the money will be used for new coke ovens and subsidiary interests are to be established close to the main plant.

T. E. EVANS AND CO., LTD., have removed from 112 and 113 Fenchurch Street to Staple Hall, Stone House Court, Bishopsgate, London, E.C.3. Their new telephone numbers are Avenue 5483, 5484, 5485.

THE L.N.E.R. has placed orders with I.C.I. (Metals), Kynoch Works, Witton, Birmingham, and Clayton and Co. (Penistone), Westhorpe Works, Penistone, Yorks, for 707,760 fog signals.

A FIRST CARGO OF 400 TONS OF NICKEL ORE will be shipped in the near future from Petsamo, Finland, to Swansea. The Mond Nickel Co.—a subsidiary of the International Nickel Co. of Canada—owns all the shares of Petsamon Nikkeli O/Y.

A TANK WAGGON CONTAINING SULPHURIC ACID, which had been left in a siding at Pontardawe (Swansea Valley) Steel Works, exploded last week. Several people had fortunate escapes as a column of acid shot into the air and splashed through the open windows of the works office, but nobody was hurt.

THE LONDON SHELLAC RESEARCH BUREAU has just published Technical Paper No. 10, "Fundamental Physical Properties of Lac, Part IV, Optical Properties," by L. C. Verman. In this, the last paper of the series on physical properties, the various optical properties of lac are discussed with some general observations that have a practical or theoretical interest.

IN CONNECTION WITH THE PROPOSED REVIVAL of the Caledonian Power Scheme, an informal meeting was held in Inverness on August 27, when representatives of the British Oxygen Co., promoters of the scheme, had a discussion with the Law Committee of Inverness County Council. The meeting was presided over by Major Alastair Fraser, and the proceedings were in private.

THE NINTH ANNUAL FLOWER AND VEGETABLE SHOW of the employees of Boots Pure Drug Co., Ltd., was held in the men's recreation room, Parkinson Street, Nottingham, on August 29. There were forty-seven classes and about 300 exhibits. The produce was sold and the proceeds divided between the Nottingham General Hospital and the Harlow Wood Orthopaedic Hospital.

THE OIL INDUSTRY IN THE LOTHIANS continues to experience very satisfactory trade. The shale miners and oil workers are getting steady employment, and all departments at the works are fully employed. The increase in the price of petrol, which was expected earlier in the year, has not materialised, but present rates yield a fair margin of profit. The other products continue in good demand.

NO ONE WAS TO BLAME FOR THE EXPLOSION at Woolwich Arsenal on July 8 which killed five men, including Commander P. A. M. Long, ordnance assistant in the Armament Supply Department of the Admiralty. That is the decision which has been announced by a conference representing the War Office, the Admiralty, and the Air Ministry, which has considered the report of the court of inquiry into the cause of the explosion, but the report of the court of inquiry is not to be published.

THERE WERE NEGOTIATIONS in London on August 28 between Imperial Chemical Industries, Ltd., and the Amalgamated Engineering Union regarding the wages and conditions of employment of I.C.I. engineers. When the discussions were adjourned it was stated that they were proceeding very satisfactorily. A meeting was arranged for yesterday (Friday) between Imperial Chemical Industries and the Boilermakers' Society concerning conditions of employment.

THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH will have a large stand (Gallery Stand Nos. 79 to 82) at the Building Exhibition to be held at Olympia. Most of the work on building research carried out under the Department is done at the Building Research Station but certain investigations, in particular work on acoustics, are carried out at the National Physical Laboratory in close collaboration with the Building Research Station, while the study of timber is the task of the Forest Products Research Laboratory. All three organisations of the Department are taking part in the exhibition.

THE UNITED STATES BUREAU OF MINES has just published the "Minerals Yearbook," for 1936, which provides in convenient form a comprehensive and accurate record of economic developments and trends in the mineral industries of the United States during the year 1935. In addition to a presentation of the fundamental statistics of the production and marketing of a hundred commercial minerals, world production of minerals and the economic aspects of international mineral policies are reviewed. The mineral production of the United States in 1935 was valued at $3,688,000,000, an increase of nearly 11 per cent. from $3,325,100,00 in 1934.

THE ADDRESS of United Indigo and Chemical is now at 20 Lord Street, Manchester.

IT IS REPORTED that the Garston Copper Works of Imperial Chemical Industries, Ltd., at Liverpool are to be closed down and transferred to Swansea. Between 200 and 300 employees in Liverpool will be affected, but efforts will be made to retain as many of them as possible.

HULL DEVELOPMENT COMMITTEE has issued a survey of the city's industries and imports, comprising a very complete account of the resources of local industry. It stresses the advantages of Hull as a centre for the manufacture of a great many articles requiring the use of large quantities of alcohol, acetone, acetic acid and butyl alcohol and many other solvents and related chemical compounds.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

KIRKLEES, LTD., Tottington (Lancs.), manufacturers of artificial silk, etc. (M., 5/9/36.) August 20. £25,000 debenture stock, part of £125,000 already registered. *£100,000 debenture stock. October 15, 1935.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

PERKINS, HAROLD WALTER REID, 68 Upper Gloucester Place, Marylebone, employee of Imperial Chemicals, Ltd. (C.C., 5/9/36.) £22 6s. 2d. July 28.

New Companies Registered

The Bone Research and Development Association, Ltd.—Registered August 28. To conduct researches upon the chemical constitution, carbonisations, hydrogenation, oxidation, gasification and combustion of coals and the cokes, gases and by-products obtainable therefrom, upon pulverised coals and their combustion and application in furnaces, and in internal combustion engines and the like, and upon the chemical constitution of oil and liquid fuels and their cracking, distillation, pyrolysis, condensation and combustion and explosion generally, and upon all manner of gaseous fuels and their applications generally, etc. A subscriber: A. W. Rodger, 52 Shortlands Road, Shortlands, Kent.

The Rodesin Chemical Co., Ltd.—Registered August 26. Nominal capital £100. To carry on the business of manufacturers of and dealers in chemicals, chemical and medicinal products, and fertilisers, surgical, veterinary and horticultural requisites, etc. A subscriber: Hans. N. Lowenstein, 15 Lime Street, London, E.C.3.

Books Received

Carbon Dioxide. By Elton L. Quinn and Charles L. Jones. New York: Reinhold Publishing Corporation. London: Chapman and Hall, Ltd. Pp. 290. 37s. 6d.

Birmingham Annual Report of the City Analyst for the Year 1935. By H. H. Bagnall. Pp. 55.

Weekly Prices of British Chemical Products

IN the rubber chemicals section there have been slight reductions in the price of cadmium sulphide and lampblack, but the price of vermilion, pale or deep, has increased from 4s. 6d. to 5s. 1d. per lb. There are no price changes to report in the markets for heavy chemicals, wood distillation products, perfumery chemicals, essential oils and intermediates. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—The chemical market on the Manchester Royal Exchange during the past week has been a little more animated and trading conditions have been less under the influence of holiday conditions, with the present week marking the end of the important stoppages in Lancashire industrial centres. Traders in chemicals report only moderate activity still from the point of view of fresh buying locally, but a favourable factor is that delivery specifications for most descriptions of heavy chemical products tend to cover pretty well normal quantities, and this is also the experience with regard to the miscellaneous materials. Prices generally are on a steady basis, and in the coal-tar products market, notably in cresylic acid, the tendency seems to be towards still higher prices.

GLASGOW.—Business in general chemicals has been rather quiet during the week, both for home trade and export. Prices generally continue steady at about previous figures with no important changes to report, but lead and copper products are very firm in sympathy with the metals. Prices have been well held during the week for the more refined coal tar products and there is a continued demand for available supplies of cresylic acid. Bids for one or two spot lots have been on the top side of the price range quoted. Standard creosote is about normal, although oils of high tar acid content are difficult to procure. On the other hand, the demand for cresylic acid is having its effect upon the washed oil position, and it may be safely assumed that this product is accumulating on the manufacturing side. It is expected that fair quantities of benzole from a new source may be introduced into the market at an early date.

General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—40% technical, £16 12s. 6d. per ton. LONDON: Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—Flaked, 10d. per lb., less 2½%; ground, 10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. to 3s. 1d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 4d. to 3s. 6d. per gal. MANCHESTER: 99/100%, pale, 3s. 9d.

ACID, FORMIC.—LONDON: £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 10s. per cwt. in casks. MANCHESTER: £49 to £54 per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11½d., less 5%. SCOTLAND: 11¾d. less 5%. MANCHESTER: 11¾d. to 1s. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 10s. ex store. MANCHESTER: White powdered Cornish £18 10s. ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £11.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots. SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.

CADMIUM SULPHIDE.—3s. 8d. to 3s. 11d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: £5 10s. per ton net ex store.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 18s. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£24 to £26 per ton.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £34, brown £33.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £31 per ton less 2½%, carriage paid,

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 5s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £6 17s. 6d. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38 10s.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. per lb. less 5% carriage paid. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4¼d. per lb. MANCHESTER: £39 per ton.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. Crystals 8¾d. MANCHESTER: B.P. 10¾d. to 11¼d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 7¼d. to 8d. per lb. SCOTLAND: 7¼d. net, ex store. MANCHESTER: Yellow, 8¼d. to 8¾d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £17 15s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. SCOTLAND: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£29 per ton. SCOTLAND: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b. SCOTLAND: £16 10s. per ton less 5%.

SULPHUR.—£9 to £9 5s. per ton. SCOTLAND: £8 to £9.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—September, £6 16s. per ton; October, £6 17s. 6d.; November, £6 19s.; December, £7 0s. 6d. for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.
MANCHESTER: Brown, £9; grey, £10 10s.

CALCIUM CYANAMIDE.—September, £6 16s. 3d. per ton; October, £6 17s. 6d.; November, £6 18s. 9d.; December, £7; carriage paid to any railway station in Great Britain in lots of 4 tons and over.

NITRO-CHALK.—£7 5s. per ton to end of September.

NITRATE OF SODA.—£7 12s. 6d. per ton to end of September.

CONCENTRATED COMPLETE AND AMMONIUM PHOSPHATE FERTILISERS. £10 12s. to £11 15s. per ton, according to specification. The prices for N.P. fertilisers remain the same as for last season, £10 5s. to £13 15s. per ton for minimum 6-ton lots delivered buyer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 3s. to 3s. 1d. per gal.; 99/100%, 3s. 4d. to 4s. per gal., according to specification; pale 98%, 3s. to 3s. 1d.; dark, 2s. 4d. to 2s. 5d. GLASGOW: Pale, 99/100%, 2s. 9d. to 3s. 3d. per gal.; pale, 97/99%, 2s. 6d. to 2s. 9d.; dark, 97/99%, 2s. 3d. to 2s. 4d.; high boiling acids, 1s. 8d. to 2s.; American specification, 2s. 9d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 2s. 3d. to 2s. 6d. per gal. MANCHESTER: Crystals, 6¾d. per lb.; crude, 2s. 7d. to 2s. 8d. per gal. GLASGOW: Crude, 60's, 2s. 4d. to 2s. 6d. per gal.; distilled, 60's, 2s. 8d. to 3s.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s. 3½d. GLASGOW: Crude, 8½d. to 9d. per gal.; motor, 1s. 2d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW. Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 4d. to 1s. 5d.; 90% 190, 1s. to 1s. 1d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £22 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £7 to £8 per ton (bags free).

PYRIDINE.—90/140%, 6s. to 7s. per gal.; 90/180, 2s. 3d. GLASGOW: 90% 140, 6s. to 6s. 6d. per gal.; 90% 160, 5s. to 5s. 6d.; 90% 180, 2s. 6d.

TOLUOL.—90%, 1s. 11d. per gal.; pure, 2s. 3d. GLASGOW: 90% 120, 1s. 10d. to 1s. 11d. per gal.

XYLOL.—Commercial, 2s. per gal.; pure, 2s. 2d. GLASGOW: Commercial, 1s. 11d. to 2s. per gal.

PITCH.—Medium, soft, 35s. to 36s. per ton, in bulk at makers works. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 30s. to 35s. per ton; in bulk for home trade, 32s. 6d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 to £8 10s. per ton; grey, £10 5s. to £10 15s. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £9; grey, £10.

CHARCOAL.—£5 to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £45 to £48 per ton.

WOOD CREOSOTE.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.

WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 9d. per gal.

WOOD TAR.—£2 to £2 10s. per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
o-CRESOL 30/31° C.—6d. per lb. in 1-ton lots.
p-CRESOL 34-5° C.—1s. 6d. per lb. in ton lots.
m-CRESOL 98/100%.—1s. 7d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.
α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. to 11d. per lb.
p-TOLUIDINE.—1s. 11d. per lb.

Latest Oil Prices

LONDON, Sept. 2.—LINSEED OIL was steady. Spot, £27 15s. per ton (small quantities), Sept. and Sept.-Dec., £25 5s., naked. SOYA BEAN OIL was slow. Oriental (bulk), spot, Rotterdam, £24 10s. per ton. RAPE OIL was quiet. Crude extracted, £34 10s. per ton; technical refined, £35 10s., naked, ex wharf. COTTON OIL was steady. Egyptian crude, £29 per ton; refined common edible, £32 10s.; and deodorised, £34 10s., naked, ex mill (small lots, £1 10s. extra). TURPENTINE was unchanged. American, spot, 39s. 3d. per cwt.

HULL.—LINSEED OIL, spot, quoted £25 15s. per ton; Sept. and Sept.-Dec., £25 5s.; Jan.-April, £25 2s. 6d. COTTON OIL, Egyptian, crude, spot, £30; edible, refined, spot, £32 10s.; technical, spot, £32 10s.; deodorised, £34 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £24 10s., naked. GROUNDNUT OIL, extracted, spot, £34; deodorised, £37. RAPE OIL, extracted, spot, £33 10s.; refined, £34 10s. SOYA OIL, extracted, spot, £30; deodorised, £33 per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 43s. per cwt.; firsts, 38s.; seconds, 36s. TURPENTINE, American, spot, 42s. per cwt.

Company News

British Coal Distillation.—The accounts to November 30 show loss of £14,414 (against £8,598), increasing debit brought in to £61,161.

Amalgamated Zinc (De Bavay's).—The directors have maintained the total distribution for the year ended June 30 last at 5 per cent., with a final dividend of 2½ per cent., payable on October 9.

Thorncliffe Coal Distillation, Ltd.—This company, which is controlled by Newton Chambers and Co., Ltd., has resumed dividends on the ordinary shares with a payment of 3d. per share or 25 yer cent., less tax, in respect of the year to June 30 last. The last ordinary dividend was 66⅔ per cent., tax free, for 1923-24.

F. Steiner & Co.—The report for the year to end July shows that after charging £34,325 for repairs and depreciation of machinery and paying twelve months' interest on the 4 per cent. first mortgage debenture stock, the loss for the year amounts to £61,013. Adding this to the debit balance of £258,425 brought in, there is a total debit of £319,438 to go forward. In the previous year the accounts showed a loss of £36,129, when £40,656 was deducted for repairs and depreciation.

Greeff-Chemicals Holdings.—The statutory report states total number of shares allotted is 250,000 5½ per cent. cumulative preference shares of 10s. each and 500,000 ordinary shares of 5s. each. Payments: Purchased price of whole of issued shares of R. W. Greeff and Co. under contract (1) mentioned in prospectus, £232,150; payment to R. W. Greeff and Co. in respect of indemnity under contract (3) mentioned in prospectus, £68,625; preliminary expenses, £9,990; underwriting and overriding commissions, £1,687; stamp duties on transfer of the above-mentioned shares of R. W. Greeff and Co., Ltd., £2,322; other payments, £31; balance at bank, £996.

United Turkey Red Co.—The directors decided to pay half-yearly dividend on 4 per cent. first preference shares, but to make no payment meantime on 5½ per cent. second preference or ordinary shares.

Pinchin, Johnson and Co.—The directors have declared an interim dividend of 7½ per cent., less tax, on the ordinary shares, payable on September 22. This is at the same rate as for 1934 and 1935, when final dividends of 10 per cent. and 12½ per cent. were paid, making total distributions of 17½ per cent. and 20 per cent., less tax, respectively.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Argentina.—The British Commercial Counsellor at Buenos Aires reports that the Argentine National Sanitation Works Department is calling for tenders, to be presented in Buenos Aires by November 3, for the installation of a sulphuric acid concentration plant at its San Isidro establishment, for the supply and erection of the necessary machinery and equipment, and for the technical supervision of the plant during a guarantee period of six months. Firms desirous of offering plant of United Kingdom manufacture can obtain the further details of this call for tenders, upon application to the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. (Ref. No. T.Y. 30,706.)

Venezuela.—An agent established at Caracas, Venezuela, wishes to obtain the representation of United Kingdom exporters of pharmaceutical products. (Ref. No. 218.)

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